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OM protein - protein search, using sw model

Run on: March 9, 2005, 01:48:13 ; Search time 54.3026 Seconds
(without alignments)
370.361 Million cell updates/sec

Title: US-10-054-873-5
Perfect score: 294
Sequence: 1 FVNQHLCGSHLVEALYLVCG.....IVEQCCTSICSILYQLENYCN 52

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 2105692 seqs, 386760381 residues

Total number of hits satisfying chosen parameters: 2105692

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : A_Geneseq_16Dec04:*
1: geneseqp1980s:*
2: geneseqp1990s:*
3: geneseqp2000s:*
4: geneseqp2001s:*
5: geneseqp2002s:*
6: geneseqp2003as:*
7: geneseqp2003bs:*
8: geneseqp2004s:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

		8					
Result		Query					
No.	Score	Match	Length	DB	ID	Description	
1	294	100.0	52	2	AAY42859	Aay42859	Human ins
2	294	100.0	56	2	AAR68901	Aar68901	Human pro
3	294	100.0	56	2	AAR78665	Aar78665	Proinsuli
4	294	100.0	63	2	AAR68900	Aar68900	Human pro
5	294	100.0	96	2	AAR68899	Aar68899	Human pro
6	294	100.0	96	2	AAR78662	Aar78662	Fusion pr
7	294	100.0	107	2	AAY42860	Aay42860	hGH-mini-
8	294	100.0	116	2	AAR98897	Aar98897	SOD-proin
9	294	100.0	137	2	AAR71692	Aar71692	Mating fa

10	294	100.0	145	2	AAR71694	Aar71694	Mating fa
11	294	100.0	146	2	AAR71695	Aar71695	Mating fa
12	294	100.0	150	2	AAAY42861	Aay42861	Chimeric
13	291	99.0	57	2	AAR04582	Aar04582	Proinsuli
14	287	97.6	52	2	AAR11899	Aar11899	Example o
15	283.5	96.4	53	2	AAR65883	Aar65883	Di-Arg- (B
16	283.5	96.4	53	2	AAW18007	Aaw18007	Ins1 doub
17	283.5	96.4	160	2	AAR79056	Aar79056	Glycosylp
18	282.5	96.1	117	2	AAR98896	Aar98896	SOD-proin
19	281.5	95.7	60	1	AAP20002	Aap20002	Human pro
20	281	95.6	58	7	ADF15278	Adf15278	Human alb
21	281	95.6	58	7	ADF15279	Adf15279	Human alb
22	281	95.6	58	7	ADF16619	Adf16619	Human alb
23	281	95.6	58	7	ADH21379	Adh21379	Human mut
24	281	95.6	58	7	ADH21849	Adh21849	Human syn
25	281	95.6	58	7	ADH21378	Adh21378	Human mut
26	281	95.6	662	7	ADF16456	Adf16456	Human alb
27	281	95.6	662	7	ADH21772	Adh21772	Human alb
28	281	95.6	667	7	ADF15064	Adf15064	Human alb
29	281	95.6	667	7	ADF15065	Adf15065	Human alb
30	281	95.6	667	7	ADH21310	Adh21310	Human alb
31	281	95.6	667	7	ADH21309	Adh21309	Human alb
32	279	94.9	62	7	ADF16653	Adf16653	Human alb
33	279	94.9	62	7	ADF16606	Adf16606	Human alb
34	279	94.9	62	7	ADF16607	Adf16607	Human alb
35	279	94.9	62	7	ADH21866	Adh21866	Human lon
36	279	94.9	62	7	ADH21842	Adh21842	Human syn
37	279	94.9	62	7	ADH21843	Adh21843	Human syn
38	279	94.9	671	7	ADF16444	Adf16444	Human alb
39	279	94.9	671	7	ADF16490	Adf16490	Human alb
40	279	94.9	671	7	ADF16443	Adf16443	Human alb
41	279	94.9	671	7	ADH21765	Adh21765	Human alb
42	279	94.9	671	7	ADH21766	Adh21766	Human alb
43	279	94.9	671	7	ADH21789	Adh21789	Human alb
44	278.5	94.7	51	3	AAB12771	Aab12771	Human mat
45	278.5	94.7	51	3	AAB12774	Aab12774	Human mat

ALIGNMENTS

RESULT 1

AAAY42859

ID AAAY42859 standard; protein; 52 AA.

XX

AC AAAY42859;

XX

DT 19-JAN-2000 (first entry)

XX

DE Human insulin precursor, SEQ ID 5.

XX

KW Insulin; precursor; growth hormone; chaperone; intramolecular; folding;
KW conformation; chimeric protein; cleavable; recombinant; production;
KW yield.

XX

OS Homo sapiens.

XX

PN WO9950302-A1.
 XX
 PD 07-OCT-1999.
 XX
 PF 31-MAR-1998; 98WO-CN000052.
 XX
 PR 31-MAR-1998; 98WO-CN000052.
 XX
 PA (TONG-) TONGHUA GANTECH BIOTECHNOLOGY LTD.
 XX
 PI Gan Z;
 XX
 DR WPI; 1999-610839/52.
 XX
 PT New chimeric proteins containing human growth hormone fragment, used
 PT particularly for the production of human insulin.
 XX
 PS Claim 12; Page 29-30; 46pp; English.
 XX
 CC This sequence represents a human insulin precursor comprising insulin A
 CC and B chains. This insulin precursor is a component of the chimeric
 CC proteins hGH-mini-proinsulin (AAY42860) and the chimeric protein given in
 CC AAY42861. These chimeric proteins additionally contain an N-terminal
 CC fragment of human growth hormone (hGH) and a cleavable peptide linker
 CC (AAY42857). The hGH portion of the chimeric protein acts as an
 CC intramolecular chaperone (IMC) for the insulin precursor, enabling it to
 CC fold correctly. The cleavable peptide linker has a C-terminal Arg residue
 CC which enables the hGH portion of the chimeric protein to be removed after
 CC folding has taken place. Production of recombinant human insulin via an
 CC hGH-proinsulin chimeric protein can provide human insulin with correctly
 CC linked cysteine bridges with fewer necessary procedural steps, and hence
 CC resulting in a higher yield of human insulin. The IMC sequences not only
 CC protect insulin sequences from intracellular degradation by a
 CC microorganism host, but also promote the folding of the fused insulin
 CC precursor, facilitate the solubility of the fusion protein and decrease
 CC the intermolecular interactions among the fusion proteins, thus allowing
 CC folding of the fused insulin precursor at commercially useful high
 CC concentrations. The procedural steps of cyanogen bromide cleavage,
 CC oxidative sulfitolysis and related purification steps can thus be
 CC eliminated, along with the use of high concentrations of mercaptan or the
 CC use of hydrophobic absorbent resins
 XX
 SQ Sequence 52 AA;

Query Match 100.0%; Score 294; DB 2; Length 52;
 Best Local Similarity 100.0%; Pred. No. 1.4e-26;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSI~~CS~~LYQLENYCN 52
 ||||||||||||||||||||||||||||||||||||||||||||
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSI~~CS~~LYQLENYCN 52

RESULT 2
 AAR68901
 ID AAR68901 standard; peptide; 56 AA.
 XX

AC AAR68901;
 XX
 DT 25-MAR-2003 (revised)
 DT 02-MAR-1995 (first entry)
 XX
 DE Human pro-insulin 3.
 XX
 KW Pro-insulin; A-chain; B-chain; C-chain; disulphide; mercaptan;
 KW chaotropic agent.
 XX
 OS Homo sapiens.
 XX
 PN EP600372-A1.
 XX
 PD 08-JUN-1994.
 XX
 PF 25-NOV-1993; 93EP-00118993.
 XX
 PR 02-DEC-1992; 92DE-04240420.
 XX
 PA (FARH) HOECHST AG.
 XX
 PI Obermeier R, Gerl M, Ludwig J, Sabel W;
 XX
 DR WPI; 1994-177718/22.
 XX
 PT Prodn. of pro-insulin with correct di:sulphide bridges - by treating
 PT recombinant precursor protein with mercaptan in alkali and in presence of
 PT chaotropic agent, then isolation on hydrophobic resin.
 XX
 PS Disclosure; Page 12; 15pp; German.
 XX
 CC Pro-insulin is produced by treating recombinant precursor protein with a
 CC mercaptan to provide 2-10 SH residues per Cys residue, in presence of a
 CC chaotropic agent and in aq. medium of pH 10-11, treating the prod. with 3
 CC -50 g hydrophobic adsorber resin per l aq. medium of pH 4-7, isolating
 CC the adsorbed resin and pro-insulin and desorbing the pro-insulin. This
 CC method produces pro-insulin with correctly bonded Cys bridges. Compared
 CC with known methods it involves fewer stages (esp. no sulphitolysis or
 CC cyanogen bromide cleavage) and overall losses during purification are
 CC reduced, i.e. the process is quicker and gives better yields. Sequences
 CC of insulin chain A, B and C are given in AAR68895-97. Sequences of pro-
 CC insulin 1-4 are given in AAR68898-901. (Updated on 25-MAR-2003 to correct
 CC PN field.)
 XX
 SQ Sequence 56 AA;

Query Match 100.0%; Score 294; DB 2; Length 56;
 Best Local Similarity 100.0%; Pred. No. 1.5e-26;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 5 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 56

RESULT 3

AAR78665

ID AAR78665 standard; protein; 56 AA.

XX

AC AAR78665;

XX

DT 03-APR-1996 (first entry)

XX

DE Proinsulin sequence 3.

XX

KW Proinsulin; post-translational modification; recombinant production;

KW protein folding; conformation.

XX

OS Synthetic.

XX

FH Key Location/Qualifiers

FT Region 1. .4

FT /label= R2

FT /note= "a peptide of 4 amino acids"

FT Peptide 5. .34

FT /label= R1-(B2-B29)-Y

FT /note= "human insulin B-chain"

FT Region 35

FT /label= X

FT Peptide 36. .56

FT /label= Gly-(A2-A20)-R3

FT /note= "human insulin A-chain"

XX

PN EP668292-A2.

XX

PD 23-AUG-1995.

XX

PF 09-FEB-1995; 95EP-00101748.

XX

PR 18-FEB-1994; 94DE-04405179.

XX

PA (FARH) HOECHST AG.

XX

PI Obermeier R, Gerl M, Ludwig J, Sabel W;

XX

DR WPI; 1995-284754/38.

XX

PT Isolation of insulin that is correctly post-translationally processed -

PT by reacting pro:insulin with a mercaptan in the presence of a chaotropic

PT agent and purificn. after absorption to hydrophobic resin.

XX

PS Example 2; Page 13; 16pp; German.

XX

CC The present sequence is an example of a proinsulin molecule corresp. to
CC the general formula R2-R1-(B2-B29)-Y-X-Gly-(A2-A20)-R3 (II). In formula
CC (II), X = Lys, Arg or a peptide of 2-35 amino acids contg. Lys or Arg at
CC the N- and C-termini; Y = a natural amino acid; R1 = Phe or a bond; R2 =
CC H, Arg, Lys, a peptide of 2-45 amino acids contg. Arg or Lys at the N-
CC and C-termini; R3 = a natural amino acid; (A2-A20) and (B2-B29) are the
CC insulin A- and B-chain sequences from human or other insulin. The
CC proinsulin molecule (produced in recombinant E.coli) is reacted with
CC mercaptan at a ratio of 2-10 SH residues of mercaptan per Cys residue of
CC proinsulin. The reaction takes place in the presence of a chaotropic

CC method produces pro-insulin with correctly bonded Cys bridges. Compared
CC with known methods it involves fewer stages (esp. no sulphitolysis or
CC cyanogen bromide cleavage) and overall losses during purification are
CC reduced, i.e. the process is quicker and gives better yields. Sequences
CC of insulin chain A, B and C are given in AAR68895-97. Sequences of pro-
CC insulin 1-4 are given in AAR68898-901. (Updated on 25-MAR-2003 to correct
CC PN field.)

XX

SQ Sequence 63 AA;

Query Match 100.0%; Score 294; DB 2; Length 63;

Best Local Similarity 100.0%; Pred. No. 1.7e-26;

Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52

|||||

Db 12 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 63

RESULT 5

AAR68899

ID AAR68899 standard; peptide; 96 AA.

XX

AC AAR68899;

XX

DT 25-MAR-2003 (revised)

DT 02-MAR-1995 (first entry)

XX

DE Human pro-insulin 2.

XX

KW Pro-insulin; A-chain; B-chain; C-chain; disulphide; mercaptan;

KW chaotropic agent.

XX

OS Homo sapiens.

XX

PN EP600372-A1.

XX

PD 08-JUN-1994.

XX

PF 25-NOV-1993; 93EP-00118993.

XX

PR 02-DEC-1992; 92DE-04240420.

XX

PA (FARH) HOECHST AG.

XX

PI Obermeier R, Gerl M, Ludwig J, Sabel W;

XX

DR WPI; 1994-177718/22.

XX

PT Prodn. of pro-insulin with correct di:sulphide bridges - by treating

PT recombinant precursor protein with mercaptan in alkali and in presence of

PT chaotropic agent, then isolation on hydrophobic resin.

XX

PS Disclosure; Page 11; 15pp; German.

XX

CC Pro-insulin is produced by treating recombinant precursor protein with a

CC mercaptan to provide 2-10 SH residues per Cys residue, in presence of a

CC chaotropic agent and in aq. medium of pH 10-11, treating the prod. with 3
 CC -50 g hydrophobic adsorber resin per l aq. medium of pH 4-7, isolating
 CC the adsorbed resin and pro-insulin and desorbing the pro-insulin. This
 CC method produces pro-insulin with correctly bonded Cys bridges. Compared
 CC with known methods it involves fewer stages (esp. no sulphitolysis or
 CC cyanogen bromide cleavage) and overall losses during purification are
 CC reduced, i.e. the process is quicker and gives better yields. Sequences
 CC of insulin chain A, B and C are given in AAR68895-97. Sequences of pro-
 CC insulin 1-4 are given in AAR68898-901. (Updated on 25-MAR-2003 to correct
 CC PN field.)

XX

SQ Sequence 96 AA;

Query Match 100.0%; Score 294; DB 2; Length 96;
 Best Local Similarity 100.0%; Pred. No. 2.7e-26;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 45 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 96

RESULT 6

AAR78662

ID AAR78662 standard; protein; 96 AA.

XX

AC AAR78662;

XX

DT 03-APR-1996 (first entry)

XX

DE Fusion protein contg. proinsulin sequence 3.

XX

KW Proinsulin; post-translational modification; recombinant production;
 KW protein folding; conformation.

XX

OS Synthetic.

XX

FH	Key	Location/Qualifiers
FT	Region	41. .44
FT		/label= R2
FT		/note= "a peptide of 4 amino acids"
FT	Peptide	45. .74
FT		/label= R1-(B2-B29)-Y
FT		/note= "human insulin B-chain"
FT	Region	75
FT		/label= X
FT	Peptide	76. .96
FT		/label= Gly-(A2-A20)-R3
FT		/note= "human insulin A-chain"

XX

PN EP668292-A2.

XX

PD 23-AUG-1995.

XX

PF 09-FEB-1995; 95EP-00101748.

XX

PR 18-FEB-1994; 94DE-04405179.

XX
PA (FARH) HOECHST AG.
XX
PI Obermeier R, Gerl M, Ludwig J, Sabel W;
XX
DR WPI; 1995-284754/38.
XX
PT Isolation of insulin that is correctly post-translationally processed -
PT by reacting pro:insulin with a mercaptan in the presence of a chaotropic
PT agent and purificn. after absorption to hydrophobic resin.
XX
PS Example 2; Page 8; 16pp; German.
XX
CC The present sequence is that of a fusion protein, produced in E.coli
CC which contains an example of a proinsulin molecule corresp. to the
CC general formula R2-R1-(B2-B29)-Y-X-Gly-(A2-A20)-R3 (II). In formula (II),
CC X = Lys, Arg or a peptide of 2-35 amino acids contg. Lys or Arg at the N-
CC and C-termini; Y = a natural amino acid; R1 = Phe or a bond; R2 = H, Arg,
CC Lys, a peptide of 2-45 amino acids contg. Arg or Lys at the N- and C-
CC termini; R3 = a natural amino acid; (A2-A20) and (B2-B29) are the insulin
CC A- and B-chain sequences from human or other insulin. The proinsulin
CC molecule, released by cyanogen bromide, is reacted with mercaptan at a
CC ratio of 2-10 SH residues of mercaptan per Cys residue of proinsulin. The
CC reaction takes place in the presence of a chaotropic auxiliary agent at
CC pH 10-11 and results in proinsulin with correctly linked cystine bridges.
CC Reaction with trypsin and opt. carboxypeptidase B yields correctly folded
CC insulin. The insulin is isolated by absorption on a hydrophobic resin
XX
SQ Sequence 96 AA;

Query Match 100.0%; Score 294; DB 2; Length 96;
Best Local Similarity 100.0%; Pred. No. 2.7e-26;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
|||||
Db 45 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN.96

RESULT 7

AA42860

ID AA42860 standard; protein; 107 AA.

XX

AC AA42860;

XX

DT 19-JAN-2000 (first entry)

XX

DE hGH-mini-proinsulin chimeric protein.

XX

KW Insulin; precursor; growth hormone; chaperone; intramolecular; folding;
KW conformation; chimeric protein; cleavable; recombinant; production;
KW yield.

XX

OS Synthetic.

OS Homo sapiens.

XX

PN WO9950302-A1.

DT 03-FEB-1997 (first entry)
 XX
 DE SOD-proinsulin hybrid polypeptide.
 XX
 KW Insulin; proinsulin; hybrid polypeptide; protein folding;
 KW enzymatic cleavage; cyanogen bromide; sulphitolysis.
 XX
 OS Homo sapiens.
 XX
 PN WO9620724-A1.
 XX
 PD 11-JUL-1996.
 XX
 PF 29-DEC-1994; 94WO-US013268.
 XX
 PR 29-DEC-1994; 94WO-US013268.
 XX
 PA (BIOT-) BIO-TECHNOLOGY GENERAL CORP.
 XX
 PI Hartman JR, Mendelovitz S, Gorecki M;
 XX
 DR WPI; 1996-333766/33.
 DR N-PSDB; AAT34670.
 XX
 PT Recombinant insulin prodn. by correctly folding pro-insulin hybrid
 PT polypeptide - then enzymatic cleavage of folded product, does not require
 PT sulphite protection of SH nor use of cyanogen bromide.
 XX
 PS Example 1B; Fig 7; 69pp; English.
 XX
 CC A new method for the production of recombinant human insulin comprises
 CC folding a hybrid polypeptide comprising proinsulin under conditions that
 CC permit correct disulphide bond formation and subjecting that folded
 CC protein to enzymatic cleavage. The insulin produced can then be purified.
 CC This sequence is a SOD-insulin B chain-Arg-insulin A chain hybrid
 CC polypeptide and is encoded by the plasmid construct pDBAST-LAT.
 CC Transformation of the proper E.coli host cells with pDBAST-LAT results in
 CC the efficient expression of the proinsulin hybrid polypeptide, useful for
 CC human insulin production. The method produces recombinant human insulin
 CC identical to the natural hormone. Hazardous and cumbersome procedures
 CC involving cyanogen bromide and sulphitolysis to protect SH groups are
 CC avoided since the entire hybrid polypeptide folds efficiently to the
 CC native structure even with the leader attached and Cys unprotected
 XX
 SQ Sequence 116 AA;

Query Match 100.0%; Score 294; DB 2; Length 116;
 Best Local Similarity 100.0%; Pred. No. 3.2e-26;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 65 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 116

RESULT 9
 AAR71692

ID AAR71692 standard; protein; 137 AA.
 XX
 AC AAR71692;
 XX
 DT 25-MAR-2003 (revised)
 DT 20-NOV-1995 (first entry)
 XX
 DE Mating factor alpha 1-Insulin precursor ArgB31.
 XX
 KW Human insulin precursor ArgB31; diabetes; Zinc ion complex;
 KW mating factor alpha 1.
 XX
 OS Homo sapiens.
 XX
 FH Key Location/Qualifiers
 FT Protein 1. .85
 FT /label= mating factor alpha-1
 FT Peptide 86. .116
 FT /label= B-chain
 FT Peptide 117. .137
 FT /label= A-chain
 XX
 PN WO9507931-A1.
 XX
 PD 23-MAR-1995.
 XX
 PF 16-SEP-1994; 94WO-DK000347.
 XX
 PR 17-SEP-1993; 93DK-00001044.
 PR 02-FEB-1994; 94US-00190829.
 XX
 PA (NOVO) NOVO-NORDISK AS.
 XX
 PI Havelund S, Halstrom JB, Jonassen I, Andersen AS, Markussen J;
 XX
 DR WPI; 1995-131314/17.
 DR N-PSDB; AAQ86425.
 XX
 PT Acylated insulin deriv. which may be present as a Zinc ion complex - is
 PT used to treat diabetes and is rapid acting.
 XX
 PS Example 5; Page 78; 100pp; English.
 XX
 CC AAQ86425 encodes AAR71692 mating factor alpha 1-Insulin precursor ArgB31.
 CC ArgB31 comprises the B and A chains of a claimed human insulin
 CC derivative. In the final claimed compsn. they are covalently connected
 CC via disulphide bonds between Cys residues A7/B7 and A20/B19. The
 CC derivative, which may be present as a zinc ion complex, can be used as a
 CC fast action treatment for diabetes. (Updated on 25-MAR-2003 to correct PN
 CC field.)
 XX
 SQ Sequence 137 AA;

Query Match 100.0%; Score 294; DB 2; Length 137;
 Best Local Similarity 100.0%; Pred. No. 3.8e-26;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 86 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 137

RESULT 10

AAR71694

ID AAR71694 standard; protein; 145 AA.

XX

AC AAR71694;

XX

DT 25-MAR-2003 (revised)

DT 20-NOV-1995 (first entry)

XX

DE Mating factor alpha 1-Insulin precursor ArgB1, ArgB31 N-terminal.

XX

KW Human insulin precursor ArgB1, ArgB31; diabetes; Zinc ion complex;

KW mating factor alpha 1; N-terminal EEAEAEAR.

XX

OS Homo sapiens.

XX

FH	Key	Location/Qualifiers
----	-----	---------------------

FT	Protein	1. .85
----	---------	--------

FT		/label= mating factor alpha-1
----	--	-------------------------------

FT	Peptide	86. .93
----	---------	---------

FT		/label= N-terminal peptide
----	--	----------------------------

FT	Peptide	94. .124
----	---------	----------

FT		/label= B-chain
----	--	-----------------

FT	Peptide	125. .145
----	---------	-----------

FT		/label= A-chain
----	--	-----------------

XX

PN W09507931-A1.

XX

PD 23-MAR-1995.

XX

PF 16-SEP-1994; 94WO-DK000347.

XX

PR 17-SEP-1993; 93DK-00001044.

PR 02-FEB-1994; 94US-00190829.

XX

PA (NOVO) NOVO-NORDISK AS.

XX

PI Havelund S, Halstrom JB, Jonassen I, Andersen AS, Markussen J;

XX

DR WPI; 1995-131314/17.

DR N-PSDB; AAQ86429.

XX

PT Acylated insulin deriv. which may be present as a Zinc ion complex - is

PT used to treat diabetes and is rapid acting.

XX

PS Example 5; Page 82-83; 100pp; English.

XX

CC AAQ86429 encodes AAR71694 mating factor alpha 1-Insulin precursor ArgB1,

CC ArgB31 N-terminal EEAEAEAR. The insulin precursor comprises the B and A

CC chains of a claimed human insulin derivative preceded by the N-terminal

CC amino acids EEAEAEAR. In the final claimed compsn. they are covalently

CC connected via disulphide bonds between Cys residues A7/B7 and A20/B19.

PT Acylated insulin deriv. which may be present as a Zinc ion complex - is
PT used to treat diabetes and is rapid acting.
XX
PS Example 6; Page 85; 100pp; English.
XX
CC AAQ86432 encodes AAR71695 mating factor alpha 1-Insulin precursor ArgB1,
CC ArgB31 N-terminal EEAEAEAER. The insulin precursor comprises the B and A
CC chains of a claimed human insulin derivative preceded by the N-terminal
CC amino acids EEAEAEAER. In the final claimed compsn. they are covalently
CC connected via disulphide bonds between Cys residues A7/B7 and A20/B19.
CC The derivative, which may be present as a zinc ion complex, can be used
CC as a fast action treatment for diabetes. (Updated on 25-MAR-2003 to
CC correct PN field.)
XX
SQ Sequence 146 AA;

Query Match 100.0%; Score 294; DB 2; Length 146;
Best Local Similarity 100.0%; Pred. No. 4.1e-26;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
|||||
Db 95 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 146

RESULT 12

AA42861

ID AA42861 standard; protein; 150 AA.

XX

AC AA42861;

XX

DT 19-JAN-2000 (first entry)

XX

DE Chimeric protein, SEQ ID 7.

XX

KW Insulin; precursor; growth hormone; chaperone; intramolecular; folding;
KW conformation; chimeric protein; cleavable; recombinant; production;
KW yield.

XX

OS Synthetic.

OS Homo sapiens.

XX

PN WO9950302-A1.

XX

PD 07-OCT-1999.

XX

PF 31-MAR-1998; 98WO-CN000052.

XX

PR 31-MAR-1998; 98WO-CN000052.

XX

PA (TONG-) TONGHUA GANTECH BIOTECHNOLOGY LTD.

XX

PI Gan Z;

XX

DR WPI; 1999-610839/52.

XX

PT New chimeric proteins containing human growth hormone fragment, used

PT particularly for the production of human insulin.

XX

PS Claim 14; Page 30-31; 46pp; English.

XX

CC This sequence represents a chimeric protein, which contains an N-terminal
CC fragment of human growth hormone (hGH) of the sequence given in AAY42856,
CC a cleavable peptide linker (AAY42857), and a human insulin precursor
CC comprising insulin A and B chains (AAY42859). The hGH portion of the
CC chimeric protein acts as an intramolecular chaperone (IMC) for the
CC insulin precursor, enabling it to fold correctly. The cleavable peptide
CC linker has a C-terminal Arg residue which enables the hGH portion of the
CC chimeric protein to be removed after folding has taken place. Production
CC of recombinant human insulin via an hGH-proinsulin chimeric protein can
CC provide human insulin with correctly linked cysteine bridges with fewer
CC necessary procedural steps, and hence resulting in a higher yield of
CC human insulin. The IMC sequences not only protect insulin sequences from
CC intracellular degradation by a microorganism host, but also promote the
CC folding of the fused insulin precursor, facilitate the solubility of the
CC fusion protein and decrease the intermolecular interactions among the
CC fusion proteins, thus allowing folding of the fused insulin precursor at
CC commercially useful high concentrations. The procedural steps of cyanogen
CC bromide cleavage, oxidative sulphytolysis and related purification steps
CC can thus be eliminated, along with the use of high concentrations of
CC mercaptan or the use of hydrophobic absorbent resins

XX

SQ Sequence 150 AA;

Query Match 100.0%; Score 294; DB 2; Length 150;

Best Local Similarity 100.0%; Pred. No. 4.2e-26;

Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
|
Db 99 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 150

RESULT 13

AAR04582

ID AAR04582 standard; protein; 57 AA.

XX

AC AAR04582;

XX

DT 09-SEP-2004 (revised)

DT 25-MAR-2003 (revised)

DT 14-SEP-1990 (first entry)

XX

DE Proinsulin analogue with a Lys residue linking the A and B chains.

XX

KW insulin fusion protein; pro-insulin analogue; tendamistate;

KW Lys-Lys bridge; ds.

XX

OS Synthetic.

XX

FH Key Location/Qualifiers

FT Peptide 1. .35

FT /note= "Insulin B chain"

FT Misc-difference 36

FT /note= "Lys residue linking insulin B chain to A chain"
 FT Peptide 37. .57
 FT /note= "Insulin A chain"
 XX
 PN EP367163-A.
 XX
 PD 09-MAY-1990.
 XX
 PF 28-OCT-1989; 89EP-00120056.
 XX
 PR 03-NOV-1988; 88DE-03837273.
 PR 19-AUG-1989; 89DE-03927449.
 XX
 PA (FARH) HOECHST AG.
 XX
 PI Koller KP, Riess GJ, Uhlmann E, Wallmeier H;
 XX
 DR WPI; 1990-141149/19.
 DR N-PSDB; AAQ04335.
 XX
 PT New insulin fusion proteins - comprise pro-insulin analogue linked to
 PT tendamistate.
 XX
 PS Disclosure; Page 5; 8pp; German.
 XX
 CC This sequence is joined to the C-terminus of an N-terminal fragment
 CC comprising opt. modified tendamistate. This fusion protein may be
 CC converted into human insulin using known methods. The synthetic gene was
 CC prepared by the phosphoramidite method. See also AAQ04336. (Updated on 25
 CC -MAR-2003 to correct PR field.) (Updated on 25-MAR-2003 to correct PI
 CC field.)
 CC
 CC Revised record issued on 09-SEP-2004 : Correction to pages and features
 XX
 SQ Sequence 57 AA;

Query Match 99.0%; Score 291; DB 2; Length 57;
 Best Local Similarity 98.1%; Pred. No. 3.5e-26;
 Matches 51; Conservative 1; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 6 FVNQHLCGSHLVEALYLVCGERGFFYTPKTKGIVEQCCTSICSLYQLENYCN 57

RESULT 14

AAR11899

ID AAR11899 standard; protein; 52 AA.

XX

AC AAR11899;

XX

DT 25-MAR-2003 (revised)

DT 22-JUL-1991 (first entry)

XX

DE Example of human insulin precursor.

XX

KW Human insulin; diabetes; transpeptidation.

XX
 OS Homo sapiens.
 XX
 PN EP427296-A.
 XX
 PD 15-MAY-1991.
 XX
 PF 29-MAY-1985; 90EP-00121887.
 XX
 PR 30-MAY-1984; 84DK-00002665.
 PR 08-FEB-1985; 85DK-00000582.
 XX
 PA (NOVO) NOVO-NORDISK AS.
 XX
 PI Markussen J, Fiil N, Ammerer G, Hansen MT, Thim L, Norris K;
 PI Voigt HO;
 XX
 DR WPI; 1991-141828/20.
 XX
 PT Human insulin precursors - expressed with correctly positioned
 PT di:sulphide bridges giving improved resistance to proteolysis.
 XX
 PS Claim 3; Page 18; 28pp; English.
 XX
 CC This human insulin precursor has correctly positioned disulphide bridges
 CC between the A and B chains and is more resistant to proteolytic digestion
 CC than prior art insulin precursors. Yeast strains transformed with DNA
 CC encoding this precursor can be cultured to secrete it in high yields. The
 CC precursor can be converted into mature human insulin by transpeptidation.
 CC See also AAR11897-98. (Updated on 25-MAR-2003 to correct PF field.)
 CC (Updated on 25-MAR-2003 to correct PA field.)
 XX
 SQ Sequence 52 AA;

Query Match 97.6%; Score 287; DB 2; Length 52;
 Best Local Similarity 96.2%; Pred. No. 9.2e-26;
 Matches 50; Conservative 2; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||:|||||
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKSKGIVEQCCTSICSLYQLENYCN 52

RESULT 15

AAR65883

ID AAR65883 standard; protein; 53 AA.

XX

AC AAR65883;

XX

DT 16-OCT-2003 (revised)

DT 25-MAR-2003 (revised)

DT 26-JUN-1995 (first entry)

XX

DE Di-Arg-(B31-32)-Human insulin amorphous, monospherical deriv.

XX

KW Human insulin; recombinant production; amorphous; monospherical form;
 KW diabetes mellitus.

XX
OS Homo sapiens; (produced recombinantly in Escherichia coli).
XX
FH Key Location/Qualifiers
FT Protein 1. .30
FT /label= insulin_B-chain
FT Protein 33. .53
FT /label= insulin_A-chain
XX
PN EP622376-A1.
XX
PD 02-NOV-1994.
XX
PF 21-APR-1994; 94EP-00106196.
XX
PR 27-APR-1993; 93DE-04313702.
XX
PA (FARH) HOECHST AG.
XX
PI Obermeier R, Sabel W, Deil P, Geisen K;
XX
DR WPI; 1994-334579/42.
XX
PT Amorphous, mono-spherical form of insulin derivs. - for treating diabetes
PT mellitus, are produced by diluting soln. in aq. isopropanol, are stable
PT when dried or in suspension.
XX
PS Example 2; Page 5; 10pp; German.
XX
CC This sequence is a specific example of an insulin derivative which can be
CC obtained in amorphous, monospherical form by dissolving in an n-
CC propanol/buffer mixture (pH 4.5-6.5) having n-propanol content 15%
CC relative to water. The solution is then diluted with water to reduce n-
CC propanol content to below 15%. The resulting insulin preparation is
CC stable and can be used for the treatment of diabetes mellitus. (Updated
CC on 25-MAR-2003 to correct PN field.) (Updated on 16-OCT-2003 to
CC standardise OS field)
XX
SQ Sequence 53 AA;

Query Match 96.4%; Score 283.5; DB 2; Length 53;
Best Local Similarity 98.1%; Pred. No. 2.4e-25;
Matches 52; Conservative 0; Mismatches 0; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-RGIVEQCCTSICSLYQLENYCN 52
|||||
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRRGIVEQCCTSICSLYQLENYCN 53

Search completed: March 9, 2005, 04:10:17
Job time : 56.3026 secs

GenCore version 5.1.6
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OM protein - protein search, using sw model

Run on: March 9, 2005, 04:04:46 ; Search time 14.0074 Seconds
(without alignments)
277.122 Million cell updates/sec

Title: US-10-054-873-5
Perfect score: 294
Sequence: 1 FVNQHLCGSHLVEALYLVCG.....IVEQCCTSICSLYQLENYCN 52

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 513545 seqs, 74649064 residues

Total number of hits satisfying chosen parameters: 513545

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : Issued Patents_AA:*
1: /cgn2_6/ptodata/1/iaa/5A_COMB.pep:*
2: /cgn2_6/ptodata/1/iaa/5B_COMB.pep:*
3: /cgn2_6/ptodata/1/iaa/6A_COMB.pep:*
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6: /cgn2_6/ptodata/1/iaa/backfiles1.pep:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	%		DB	ID	Description
		Query Match	Length			
1	294	100.0	56	1	US-08-160-376A-7	Sequence 7, Appli
2	294	100.0	56	1	US-08-389-487-11	Sequence 11, Appl
3	294	100.0	63	1	US-08-160-376A-6	Sequence 6, Appli
4	294	100.0	66	1	US-08-291-060B-5	Sequence 5, Appli
5	294	100.0	96	1	US-08-160-376A-5	Sequence 5, Appli
6	294	100.0	96	1	US-08-389-487-8	Sequence 8, Appli
7	294	100.0	137	1	US-08-400-256-39	Sequence 39, Appl
8	294	100.0	137	3	US-08-975-365-39	Sequence 39, Appl
9	294	100.0	145	1	US-08-400-256-45	Sequence 45, Appl
10	294	100.0	145	3	US-08-975-365-45	Sequence 45, Appl
11	294	100.0	146	1	US-08-400-256-48	Sequence 48, Appl

12	294	100.0	146	3	US-08-975-365-48	Sequence 48, Appl
13	291	99.0	57	1	US-08-030-731A-44	Sequence 44, Appl
14	283.5	96.4	53	1	US-08-233-617-4	Sequence 4, Appli
15	283.5	96.4	53	3	US-08-981-988A-42	Sequence 42, Appl
16	278.5	94.7	51	4	US-09-477-924-3	Sequence 3, Appli
17	278.5	94.7	51	4	US-09-723-981-3	Sequence 3, Appli
18	278.5	94.7	51	4	US-09-723-896-3	Sequence 3, Appli
19	277.5	94.4	53	1	US-08-233-617-3	Sequence 3, Appli
20	277	94.2	65	3	US-08-900-574-3	Sequence 3, Appli
21	276.5	94.0	55	3	US-08-900-574-6	Sequence 6, Appli
22	276.5	94.0	66	3	US-08-900-574-5	Sequence 5, Appli
23	276.5	94.0	67	3	US-08-981-988A-1	Sequence 1, Appli
24	276.5	94.0	67	3	US-08-981-988A-5	Sequence 5, Appli
25	276	93.9	67	3	US-08-900-574-7	Sequence 7, Appli
26	275.5	93.7	53	3	US-09-261-853-2	Sequence 2, Appli
27	275.5	93.7	65	1	US-08-468-674B-71	Sequence 71, Appl
28	275.5	93.7	65	1	US-08-780-571-71	Sequence 71, Appl
29	275.5	93.7	89	1	US-08-468-674B-41	Sequence 41, Appl
30	275.5	93.7	89	1	US-08-780-571-41	Sequence 41, Appl
31	275.5	93.7	91	1	US-08-468-674B-45	Sequence 45, Appl
32	275.5	93.7	91	1	US-08-780-571-45	Sequence 45, Appl
33	275.5	93.7	104	1	US-08-400-256-15	Sequence 15, Appl
34	275.5	93.7	104	3	US-08-975-365-15	Sequence 15, Appl
35	275.5	93.7	117	3	US-09-012-669F-37	Sequence 37, Appl
36	275.5	93.7	124	1	US-08-446-646-3	Sequence 3, Appli
37	275.5	93.7	124	3	US-09-012-669F-36	Sequence 36, Appl
38	275.5	93.7	124	4	US-09-894-711-18	Sequence 18, Appl
39	275.5	93.7	138	3	US-08-932-082-19	Sequence 19, Appl
40	275.5	93.7	138	4	US-09-861-687-19	Sequence 19, Appl
41	275.5	93.7	140	1	US-08-400-256-33	Sequence 33, Appl
42	275.5	93.7	140	1	US-08-400-256-42	Sequence 42, Appl
43	275.5	93.7	140	3	US-08-975-365-33	Sequence 33, Appl
44	275.5	93.7	140	3	US-08-975-365-42	Sequence 42, Appl
45	273.5	93.0	67	3	US-08-981-988A-2	Sequence 2, Appli

ALIGNMENTS

RESULT 1

US-08-160-376A-7

; Sequence 7, Application US/08160376A

; Patent No. 5473049

; GENERAL INFORMATION:

; APPLICANT: Obermeier, Ranier

; APPLICANT: Gerl, Martin

; APPLICANT: Ludwig, Jurgen

; APPLICANT: Sabel, Walter

; TITLE OF INVENTION: Process For Obtaining Proinsulin

; TITLE OF INVENTION: Possessing Correctly Linked

; TITLE OF INVENTION: Cystine Bridges

; NUMBER OF SEQUENCES: 7

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: Kenneth A. Genoni, Esq.

; STREET: Rt. 202-206 No. 5473049th/P.O. Box 2500

; CITY: Somerville

; STATE: New Jersey

```

; COUNTRY: U.S.A.
; ZIP: 08876-1258
; COMPUTER READABLE FORM:
; MEDIUM TYPE: DISKETTE, 3.5 INCH, 1.44 Mb STORAGE
; COMPUTER: IBM 386
; OPERATING SYSTEM: WINDOWS 3.1
; SOFTWARE: WORDPERFECT 5.1
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/160,376A
; FILING DATE: December 1, 1993
; CLASSIFICATION: 530
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: GE P 4240420.7
; FILING DATE: December 2, 1992
; ATTORNEY/AGENT INFORMATION:
; NAME: Barbara V. Maurer, Esq.
; REGISTRATION NUMBER: 31,287
; REFERENCE/DOCKET NUMBER: HOE 92/F 384
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (908) 231-4079
; TELEFAX: (908) 231-2255
; INFORMATION FOR SEQ ID NO: 7:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 56 Amino Acids
; TYPE: Amino Acid (AA)
; TOPOLOGY: not relevant
US-08-160-376A-7

```

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Query Match          100.0%; Score 294; DB 1; Length 56;
Best Local Similarity 100.0%; Pred. No. 1e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
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Db      5 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 56

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RESULT 2

US-08-389-487-11

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; Sequence 11, Application US/08389487
; Patent No. 5663291
; GENERAL INFORMATION:
; APPLICANT: Obermeier, Rainer
; APPLICANT: Gerl, Martin
; APPLICANT: Ludwig, Jurgen
; APPLICANT: Sabel, Walter
; TITLE OF INVENTION: Process for Obtaining Insulin Having
; TITLE OF INVENTION: Correctly Linked Cystine Bridges
; NUMBER OF SEQUENCES: 12
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Finnegan, Henderson, Farabow, Garrett &
; ADDRESSEE: Dunner
; STREET: 1300 I Street, N.W.
; CITY: Washington
; STATE: D.C.
; COUNTRY: United States of America
; ZIP: 20005-3315

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; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/389,487
; FILING DATE:
; CLASSIFICATION: 530
; ATTORNEY/AGENT INFORMATION:
; NAME: Einaudi, Carol P.
; REGISTRATION NUMBER: 32,220
; REFERENCE/DOCKET NUMBER: 02481.1424-00000
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: 202-408-4000
; TELEFAX: 202-408-4400
; INFORMATION FOR SEQ ID NO: 11:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 56 amino acids
; TYPE: amino acid
; STRANDEDNESS: single
; TOPOLOGY: linear
; MOLECULE TYPE: peptide
US-08-389-487-11

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Query Match          100.0%; Score 294; DB 1; Length 56;
Best Local Similarity 100.0%; Pred. No. 1e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db      5 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 56

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RESULT 3

US-08-160-376A-6

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; Sequence 6, Application US/08160376A
; Patent No. 5473049
; GENERAL INFORMATION:
; APPLICANT: Obermeier, Ranier
; APPLICANT: Gerl, Martin
; APPLICANT: Ludwig, Jorgen
; APPLICANT: Sabel, Walter
; TITLE OF INVENTION: Process For Obtaining Proinsulin
; TITLE OF INVENTION: Possessing Correctly Linked
; TITLE OF INVENTION: Cystine Bridges
; NUMBER OF SEQUENCES: 7
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Kenneth A. Genoni, Esq.
; STREET: Rt. 202-206 No. 5473049th/P.O. Box 2500
; CITY: Somerville
; STATE: New Jersey
; COUNTRY: U.S.A.
; ZIP: 08876-1258
; COMPUTER READABLE FORM:
; MEDIUM TYPE: DISKETTE, 3.5 INCH, 1.44 Mb STORAGE
; COMPUTER: IBM 386

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;   OPERATING SYSTEM:  WINDOWS 3.1
;   SOFTWARE:  WORDPERFECT 5.1
;   CURRENT APPLICATION DATA:
;   APPLICATION NUMBER:  US/08/160,376A
;   FILING DATE:  December 1, 1993
;   CLASSIFICATION:  530
;   PRIOR APPLICATION DATA:
;   APPLICATION NUMBER:  GE P 4240420.7
;   FILING DATE:  December 2, 1992
;   ATTORNEY/AGENT INFORMATION:
;   NAME:  Barbara V. Maurer, Esq.
;   REGISTRATION NUMBER:  31,287
;   REFERENCE/DOCKET NUMBER:  HOE 92/F 384
;   TELECOMMUNICATION INFORMATION:
;   TELEPHONE:  (908) 231-4079
;   TELEFAX:  (908) 231-2255
;   INFORMATION FOR SEQ ID NO:  6:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH:  63 Amino Acids
;   TYPE:  Amino Acid (AA)
;   TOPOLOGY:  not relevant
US-08-160-376A-6

```

```

Query Match          100.0%;  Score 294;  DB 1;  Length 63;
Best Local Similarity 100.0%;  Pred. No. 1.2e-28;
Matches  52;  Conservative  0;  Mismatches  0;  Indels  0;  Gaps  0;

```

```

Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
          ||||||||||||||||||||||||||||||||||||||||||||
Db      12 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 63

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RESULT 4

US-08-291-060B-5

; Sequence 5, Application US/08291060B

; Patent No. 5728543

; GENERAL INFORMATION:

; APPLICANT: Dorschug, Michael

; APPLICANT: Koller, Klaus-Peter

; APPLICANT: Marquardt, Rudiger

; APPLICANT: Meiwes, Johannes

; TITLE OF INVENTION: An Enzymatic Process for the

; TITLE OF INVENTION: Conversion of Preproinsulins Into Insulins

; NUMBER OF SEQUENCES: 5

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: Finnegan, Henderson, Farabow, Garrett &

; ADDRESSEE: Dunner, L.L.P.

; STREET: 1300 I Street, N.W.

; CITY: Washington

; STATE: D.C.

; COUNTRY: USA

; ZIP: 20005-3315

; COMPUTER READABLE FORM:

; MEDIUM TYPE: Floppy disk

; COMPUTER: IBM PC compatible

; OPERATING SYSTEM: PC-DOS/MS-DOS

; SOFTWARE: PatentIn Release #1.0, Version #1.30


```

; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/291,060B
; FILING DATE: 08-AUG-1994
; CLASSIFICATION: 435
; ATTORNEY/AGENT INFORMATION:
; NAME: Einaudi, Carol P.
; REGISTRATION NUMBER: 32,220
; REFERENCE/DOCKET NUMBER: 02481.1105-02000
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (202) 408-4366
; TELEFAX: (202) 408-4400
; INFORMATION FOR SEQ ID NO: 5:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 66 amino acids
; TYPE: amino acid
; STRANDEDNESS: single
; TOPOLOGY: linear
; MOLECULE TYPE: peptide
US-08-291-060B-5

```

```

Query Match          100.0%; Score 294; DB 1; Length 66;
Best Local Similarity 100.0%; Pred. No. 1.2e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```

```

Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db      15 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 66

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RESULT 5

US-08-160-376A-5

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; Sequence 5, Application US/08160376A
; Patent No. 5473049
; GENERAL INFORMATION:
; APPLICANT: Obermeier, Ranier
; APPLICANT: Gerl, Martin
; APPLICANT: Ludwig, Jurgen
; APPLICANT: Sabel, Walter
; TITLE OF INVENTION: Process For Obtaining Proinsulin
; TITLE OF INVENTION: Possessing Correctly Linked
; TITLE OF INVENTION: Cystine Bridges
; NUMBER OF SEQUENCES: 7
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Kenneth A. Genoni, Esq.
; STREET: Rt. 202-206 No. 5473049th/P.O. Box 2500
; CITY: Somerville
; STATE: New Jersey
; COUNTRY: U.S.A.
; ZIP: 08876-1258
; COMPUTER READABLE FORM:
; MEDIUM TYPE: DISKETTE, 3.5 INCH, 1.44 Mb STORAGE
; COMPUTER: IBM 386
; OPERATING SYSTEM: WINDOWS 3.1
; SOFTWARE: WORDPERFECT 5.1
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/160,376A
; FILING DATE: December 1, 1993

```

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; CLASSIFICATION: 530
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: GE P 4240420.7
; FILING DATE: December 2, 1992
; ATTORNEY/AGENT INFORMATION:
; NAME: Barbara V. Maurer, Esq.
; REGISTRATION NUMBER: 31,287
; REFERENCE/DOCKET NUMBER: HOE 92/F 384
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: (908) 231-4079
; TELEFAX: (908) 231-2255
; INFORMATION FOR SEQ ID NO: 5:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 96 Amino Acids
; TYPE: Amino Acid (AA)
; TOPOLOGY: not relevant
US-08-160-376A-5

```

```

Query Match          100.0%; Score 294; DB 1; Length 96;
Best Local Similarity 100.0%; Pred. No. 1.8e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

```

```

Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        ||||||||||||||||||||||||||||||||||||||||||||||||
Db      45 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 96

```

RESULT 6

US-08-389-487-8

```

; Sequence 8, Application US/08389487
; Patent No. 5663291
; GENERAL INFORMATION:
; APPLICANT: Obermeier, Rainer
; APPLICANT: Gerl, Martin
; APPLICANT: Ludwig, Jurgen
; APPLICANT: Sabel, Walter
; TITLE OF INVENTION: Process for Obtaining Insulin Having
; TITLE OF INVENTION: Correctly Linked Cystine Bridges
; NUMBER OF SEQUENCES: 12
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Finnegan, Henderson, Farabow, Garrett &
; ADDRESSEE: Dunner
; STREET: 1300 I Street, N.W.
; CITY: Washington
; STATE: D.C.
; COUNTRY: United States of America
; ZIP: 20005-3315
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/389,487
; FILING DATE:
; CLASSIFICATION: 530
; ATTORNEY/AGENT INFORMATION:

```



```

; INFORMATION FOR SEQ ID NO: 39:
;   SEQUENCE CHARACTERISTICS:
;     LENGTH: 137 amino acids
;     TYPE: amino acid
;     TOPOLOGY: linear
;     MOLECULE TYPE: protein
US-08-975-365-39

```

Query Match 100.0%; Score 294; DB 3; Length 137;
Best Local Similarity 100.0%; Pred. No. 2.6e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
|||||
Db 86 FVNOHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 137

RESULT 9

US-08-400-256-45

; Sequence 45, Application US/08400256

; Patent No. 5750497

; GENERAL INFORMATION:

; APPLICANT: Havelund, Svend

APPLICANT: Halstrom, John

; APPLICANT: Jonassen, Ib

; APPLICANT: Andersen, Asser Sloth

; APPLICANT: Markussen, Jan

10; TITLE OF INVENTION: ACYLATED INSULIN

NUMBER OF SEQUENCES: 49

CORRESPONDENCE ADDRESS:

ADDRESSEE: No. 5750497o No. 5750497disk of No. 5750497th America, Inc.

STREET: 405 Lexington Avenue, 64th Floor

CITY: New York

STATE: New York

; COUNTRY: United States of America

; ZIP: 10174-6401

; COMPUTER READABLE FORM:

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; MEDIUM TYPE: Floppy disk
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COMPUTER: IBM PC compatible

OPERATING SYSTEM: PC-DOS/MS-DOS

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; SOFTWARE: PatentIn Release #1.0, Version #1.25
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; CURRENT APPLICATION DATA:

APPLICATION NUMBER: US/08/400,256

; FILING DATE: 03-MAR-1995

; CLASSIFICATION: 514

; ATTORNEY/AGENT INFORMATION:

; NAME: Lambiris, Elias J.

REGISTRATION NUMBER: 33,728

REFERENCE/DOCKET NUMBER: 3985.220-US

; TELECOMMUNICATION INFORMATION:

TELEPHONE: 212-867-0123

TELEFAX: 212-878-9655

; INFORMATION FOR SEQ ID NO: 45:

; SEQUENCE CHARACTERISTICS:

LENGTH: 145 amino acids

```

;      TYPE:  amino acid

```

```

;      TOPOLOGY:  linear

```

```
; MOLECULE TYPE:  protein
US-08-400-256-45
```

Query Match 100.0%; Score 294; DB 1; Length 145;
Best Local Similarity 100.0%; Pred. No. 2.8e-28;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||
 Db 94 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 145

RESULT 10

US-08-975-365-45

; Sequence 45, Application US/08975365

; Patent No. 6011007

; GENERAL INFORMATION:

; APPLICANT: Havelund, Svend

APPLICANT: Halstrom, John

; APPLICANT: Jonassen, Ib

; APPLICANT: Andersen, Asser Sloth

; APPLICANT: Markussen, Jan

10 TITLE OF INVENTION: ACYLATED INSULIN

; NUMBER OF SEQUENCES: 49

CORRESPONDENCE ADDRESS:

ADDRESSEE: No. 6011007o No. 6011007disk of No. 6011007th America, Inc.

STREET: 405 Lexington Avenue, 64th Floor

CITY: New York

STATE: New York

; COUNTRY: United States of America

; ZIP: 10174-6401

COMPUTER READABLE FORM:

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; MEDIUM TYPE: Floppy disk

```

```

;      COMPUTER:  IBM PC compatible

```

```

; OPERATING SYSTEM:  PC-DOS/MS-DOS

```

```
; SOFTWARE: PatentIn Release #1.0, Version #1.25
```

; CURRENT APPLICATION DATA:

APPLICATION NUMBER: US/08/975,365

FILING DATE:

CLASSIFICATION: 514

; PRIOR APPLICATION DATA:

APPLICATION NUMBER: US 08/400,256

FILING DATE: 03-MAR-1995

; ATTORNEY/AGENT INFORMATION:

; NAME: Lambiris, Elias J.

; REGISTRATION NUMBER: 33,728

REFERENCE/DOCKET NUMBER: 3985.220-US

; TELECOMMUNICATION INFORMATION:

TELEPHONE: 212-867-0123

; TELEFAX: 212-878-9655

; INFORMATION FOR SEO ID NO: 45:

```

; SEQUENCE CHARACTERISTICS:

```

```

:      LENGTH:  145 amino acids

```

```

; TYPE: amino acid

```

TOPOLOGY: linear

```

; MOLECULE TYPE: protein

```

US-08-975-365-45

RESULT 13

US-08-030-731A-44

; Sequence 44, Application US/08030731A

; Patent No. 5426036

; GENERAL INFORMATION:

; APPLICANT: Koller, Klaus-Peter

; APPLICANT: Riess, Guenther Johannes

; APPLICANT: Uhlmann, Eugen

; APPLICANT: Wallmeier, Holger

; TITLE OF INVENTION: Processes for the Preparation of Foreign

; TITLE OF INVENTION: Proteins in Streptomyces

; NUMBER OF SEQUENCES: 48

; CORRESPONDENCE ADDRESS:

; ADDRESSEE: Finnegan, Henderson, Farabow, Garrett &

; ADDRESSEE: Dunner

; STREET: 1300 I Street, N.W., Suite 700

; CITY: Washington

; STATE: D.C.

; COUNTRY: USA

; ZIP: 20005-3315

; COMPUTER READABLE FORM:

; MEDIUM TYPE: Floppy disk

; COMPUTER: IBM PC compatible

; OPERATING SYSTEM: PC-DOS/MS-DOS

; SOFTWARE: PatentIn Release #1.0, Version #1.25

; CURRENT APPLICATION DATA:

; APPLICATION NUMBER: US/08/030,731A

; FILING DATE: 12-MAR-1993

; CLASSIFICATION: 435

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: US 07/189,840

; FILING DATE: 03-MAY-1988

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: US 07/430,622

; FILING DATE: 01-NOV-1989

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: US 07/687,610

; FILING DATE: 19-APR-1991

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: US 07/735,757

; FILING DATE: 29-JUL-1991

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: DE P 37 14 866.4

; FILING DATE: 05-MAY-1987

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: DE P 38 37 273.8

; FILING DATE: 03-NOV-1988

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: DE P 39 27 449.7

; FILING DATE: 19-AUG-1989

; PRIOR APPLICATION DATA:

; APPLICATION NUMBER: DE P 40 12 818.0

; FILING DATE: 21-APR-1990

; ATTORNEY/AGENT INFORMATION:

; NAME: Kirschner Michael K.
; REGISTRATION NUMBER: 34,851
; REFERENCE/DOCKET NUMBER: 02481-0593-02000
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: 202-408-4000
; TELEFAX: 202-408-4400
; INFORMATION FOR SEQ ID NO: 44:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 57 amino acids
; TYPE: amino acid
; TOPOLOGY: unknown
; MOLECULE TYPE: peptide
US-08-030-731A-44

Query Match 99.0%; Score 291; DB 1; Length 57;
Best Local Similarity 98.1%; Pred. No. 2.4e-28;
Matches 51; Conservative 1; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
| | | | | : | | | | |
Db 6 FVNQHLCGSHLVEALYLVCGERGFFYTPKTKGIVEQCCTSICSLYQLENYCN 57

RESULT 14

US-08-233-617-4

; Sequence 4, Application US/08233617
; Patent No. 5466666
; GENERAL INFORMATION:
; APPLICANT: Obermeier, Rainer
; APPLICANT: Sabel, Walter
; APPLICANT: Deil, Peter
; APPLICANT: Geisen, Karl
; TITLE OF INVENTION: Amorphous Monospherical Forms of Insulin
; TITLE OF INVENTION: Derivatives
; NUMBER OF SEQUENCES: 4
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Finnegan, Henderson, Farabow, Garrett &
; ADDRESSEE: Dunner
; STREET: 1300 I Street, N.W., Suite 700
; CITY: Washington
; STATE: D.C.
; COUNTRY: USA
; ZIP: 20005-3315
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/08/233,617
; FILING DATE: 25-APR-1994
; CLASSIFICATION: 514
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: P 43 13 702.4
; FILING DATE: 27-APR-1993
; ATTORNEY/AGENT INFORMATION:
; NAME: Carol P. Einaudi

```

;   REGISTRATION NUMBER: 32,220
;   REFERENCE/DOCKET NUMBER: 02481.1374-00000
;   TELECOMMUNICATION INFORMATION:
;   TELEPHONE: 202-408-4000
;   TELEFAX: 202-408-4400
;   INFORMATION FOR SEQ ID NO: 4:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH: 53 amino acids
;   TYPE: amino acid
;   TOPOLOGY: linear
;   MOLECULE TYPE: protein
;   ORIGINAL SOURCE:
;   ORGANISM: Escherichia coli
US-08-233-617-4

```

```

Query Match          96.4%; Score 283.5; DB 1; Length 53;
Best Local Similarity 98.1%; Pred. No. 1.8e-27;
Matches 52; Conservative 0; Mismatches 0; Indels 1; Gaps 1;

```

```

Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRRGIVEQCCTSICSLYQLENYCN 52
        |||
Db      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRRGIVEQCCTSICSLYQLENYCN 53

```

RESULT 15

```

US-08-981-988A-42
; Sequence 42, Application US/08981988A
; Patent No. 6337194
; GENERAL INFORMATION:
;   APPLICANT: Vittal Mallya Scientific Research Foundation
;   APPLICANT: The University of Leicester
;   TITLE OF INVENTION: Insulin
;   NUMBER OF SEQUENCES: 43
;   CORRESPONDENCE ADDRESS:
;   ADDRESSEE: VITTAL MALLYA SCIENTIFIC RESEARCH FOUNDATION
;   STREET: K. R. ROAD
;   CITY: BANGALORE
;   COUNTRY: INDIA
;   ZIP: 560 004
;   COMPUTER READABLE FORM:
;   MEDIUM TYPE: Floppy disk
;   COMPUTER: IBM PC compatible
;   OPERATING SYSTEM: PC-DOS/MS-DOS
;   SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)
;   CURRENT APPLICATION DATA:
;   APPLICATION NUMBER: US/08/981,988A
;   FILING DATE:
;   CLASSIFICATION: 435
;   PRIOR APPLICATION DATA:
;   APPLICATION NUMBER: GB 9513967.1
;   FILING DATE: 08-JUL-1995
;   INFORMATION FOR SEQ ID NO: 42:
;   SEQUENCE CHARACTERISTICS:
;   LENGTH: 53 amino acids
;   TYPE: amino acid
;   STRANDEDNESS:
;   TOPOLOGY: unknown

```

US-08-981-988A-42

Query Match 96.4%; Score 283.5; DB 3; Length 53;
Best Local Similarity 98.1%; Pred. No. 1.8e-27;
Matches 52; Conservative 0; Mismatches 0; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-RGIVEQCCTSICSLYQLENYCN 52
|||||
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTKRGIVEQCCTSICSLYQLENYCN 53

Search completed: March 9, 2005, 04:51:52
Job time : 15.0074 secs

GenCore version 5.1.6
Copyright (c) 1993 - 2005 Compugen Ltd.

OM protein - protein search, using sw model

Run on: March 9, 2005, 01:51:53 ; Search time 9.97786 Seconds
(without alignments)
501.437 Million cell updates/sec

Title: US-10-054-873-5
Perfect score: 294
Sequence: 1 FVNQHLCGSHLVEALYLVCG.....IVEQCCTSICSLYQLENYCN 52

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 283416 seqs, 96216763 residues

Total number of hits satisfying chosen parameters: 283416

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : PIR_79:*
1: pir1:*
2: pir2:*
3: pir3:*
4: pir4:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query		DB	ID	Description
		Match	Length			
1	273.5	93.0	51	1	INEL	insulin - elephant
2	273.5	93.0	51	1	INWHF	insulin - finback
3	273.5	93.0	51	1	INWHP	insulin - sperm wh
4	273	92.9	96	2	PC7082	epidermal growth f
5	271.5	92.3	51	1	INHY	insulin - hamster
6	268.5	91.3	51	1	INMSSP	insulin - Egyptian
7	267.5	91.0	51	2	A59151	insulin precursor
8	267	90.8	110	1	IPHU	insulin precursor
9	267	90.8	110	2	B42179	insulin precursor
10	267	90.8	110	2	JQ0178	insulin precursor
11	267	90.8	110	2	A42179	insulin precursor
12	263.5	89.6	51	1	INCMA	insulin - Arabian
13	263.5	89.6	51	1	INGT	insulin - goat

14	263.5	89.6	51	1	INWH1S	insulin - sei whal
15	263	89.5	84	1	IPPG	insulin precursor
16	263	89.5	110	1	INRB	insulin precursor
17	262.5	89.3	51	1	INCT	insulin - cat
18	262	89.1	110	1	IPDG	insulin precursor
19	261.5	88.9	51	1	INMKSQ	insulin - common s
20	260	88.4	110	2	I48166	insulin precursor
21	258.5	87.9	105	1	IPBO	insulin precursor
22	256.5	87.2	51	2	JQ0362	insulin - North Am
23	252.5	85.9	77	1	INSH	insulin precursor
24	252	85.7	86	1	IPHO	insulin precursor
25	251.5	85.5	51	1	INCB	insulin - Chinchil
26	251	85.4	108	2	A39883	insulin precursor
27	250	85.0	108	1	INMS1	insulin 1 precurs
28	249	84.7	110	1	IPRT1	insulin 1 precurs
29	248.5	84.5	51	1	INGS	insulin - goose
30	248	84.4	110	1	INMS2	insulin 2 precurs
31	248	84.4	110	1	IPRT2	insulin 2 precurs
32	246	83.7	52	2	S44470	insulin I2 - North
33	246	83.7	52	2	S44469	insulin I1 - North
34	244.5	83.2	51	1	INOS	insulin - ostrich
35	244.5	83.2	51	1	INTK	insulin - turkey (
36	244.5	83.2	51	1	A61129	insulin - black-be
37	244.5	83.2	51	1	INPQ	insulin - crested
38	244.5	83.2	51	2	A60414	insulin - slider t
39	238.5	81.1	103	2	I51221	insulin precursor
40	238	81.0	52	2	S61361	insulin - Amphiuma
41	235.5	80.1	51	2	S63590	insulin - duckbill
42	234.5	79.8	107	1	IPCH	insulin precursor
43	233.5	79.4	81	1	IPDK	insulin precursor
44	231.5	78.7	51	1	INAQ	insulin - American
45	231	78.6	52	1	INGXA	insulin - alligato

ALIGNMENTS

RESULT 1

INEL

insulin - elephant

C;Species: Elephantidae gen. sp. (elephant)

C;Date: 24-Apr-1984 #sequence_revision 30-Sep-1988 #text_change 16-Jul-1999

C;Accession: A01584

R;Smith, L.F.

Am. J. Med. 40, 662-666, 1966

A;Title: Species variation in the amino acid sequence of insulin.

A;Reference number: A90029; MUID:66160119; PMID:5949593

A;Accession: A01584

A;Molecule type: protein

A;Residues: 1-30;31-51 <SMI>

A;Note: the species of elephant is not given, but it is most probably the Indian elephant (*Elephas maximus*)

C;Superfamily: insulin

C;Keywords: hormone; pancreas

F;1-30/Domain: insulin chain B #status experimental <BCH>

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;31-51/Domain: insulin chain A #status experimental <ACH>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 93.0%; Score 273.5; DB 1; Length 51;
Best Local Similarity 94.2%; Pred. No. 1.5e-24;
Matches 49; Conservative 1; Mismatches 1; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
| | | | | : | | | | |
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-GIVEQCCTGVCSLYQLENYCN 51

RESULT 2

INWHF

insulin - finback whale (tentative sequence)

C;Species: Balaenoptera physalus (finback whale, common rorqual)

C;Date: 31-Mar-1992 #sequence_revision 31-Mar-1992 #text_change 09-Jul-2004

C;Accession: A91918

R;Hama, H.; Titani, K.; Sakaki, S.; Narita, K.

J. Biochem. 56, 285-293, 1964

A;Title: The amino acid sequence in fin-whale insulin.

A;Reference number: A91918

A;Accession: A91918

A;Molecule type: protein

A;Residues: 1-30;31-51 <HAM>

A;Cross-references: UNIPROT:P01312

C;Superfamily: insulin

C;Keywords: hormone; pancreas

F;1-30/Domain: insulin chain B #status experimental <BCH>

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;31-51/Domain: insulin chain A #status experimental <ACH>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 93.0%; Score 273.5; DB 1; Length 51;
Best Local Similarity 96.2%; Pred. No. 1.5e-24;
Matches 50; Conservative 0; Mismatches 1; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
| | | | | : | | | | |
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCTSICSLYQLENYCN 51

RESULT 3

INWHP

insulin - sperm whale

C;Species: Physeter catodon (sperm whale)

C;Date: 31-Mar-1992 #sequence_revision 31-Mar-1992 #text_change 09-Jul-2004

C;Accession: A93142; A90082

R;Ishihara, Y.; Saito, T.; Ito, Y.; Fujino, M.

Nature 181, 1468-1469, 1958

A;Title: Structure of sperm- and sei-whale insulins and their breakdown by whale pepsin.

A;Reference number: A93142

A;Accession: A93142

A;Molecule type: protein

A;Residues: 1-30;31-51 <ISH>

A;Cross-references: UNIPROT:P01312

R;Harris, J.I.; Sanger, F.; Naughton, M.A.

Arch. Biochem. Biophys. 65, 427-428, 1956
 A;Title: Species differences in insulin.
 A;Reference number: A90082
 A;Accession: A90082
 A;Molecule type: protein
 A;Residues: 1-30;31-51 <HAR>
 C;Superfamily: insulin
 C;Keywords: hormone; pancreas
 F;1-30/Domain: insulin chain B #status experimental <BCH>
 F;1-30,31-51/Product: insulin #status experimental <MAT>
 F;31-51/Domain: insulin chain A #status experimental <ACH>
 F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 93.0%; Score 273.5; DB 1; Length 51;
 Best Local Similarity 96.2%; Pred. No. 1.5e-24;
 Matches 50; Conservative 0; Mismatches 1; Indels 1; Gaps 1;

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
          |||
Db      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCTSICSLYQLENYCN 51
```

RESULT 4

PC7082

epidermal growth factor/single chain insulin fusion protein - Bacillus brevis (fragment)

C;Species: Bacillus brevis

C;Date: 18-Aug-2000 #sequence_revision 18-Aug-2000 #text_change 09-Jul-2004

C;Accession: PC7082; PC7083

R;Koh, M.; Hanagata, H.; Ebisu, S.; Morihara, K.; Takagi, H.

Biosci. Biotechnol. Biochem. 64, 1079-1081, 2000

A;Title: Use of Bacillus brevis for synthesis and secretion of Des-B30 single-chain human insulin precursor.

A;Reference number: PC7082; MUID:20335834; PMID:10879487

A;Accession: PC7082

A;Molecule type: DNA

A;Residues: 1-96 <KOH>

A;Cross-references: UNIPROT:Q7M0U6

A;Accession: PC7083

A;Molecule type: protein

A;Residues: 19-28 <KO2>

C;Genetics:

A;Gene: egf-sci

C;Superfamily: insulin

Query Match 92.9%; Score 273; DB 2; Length 96;
 Best Local Similarity 96.2%; Pred. No. 3e-24;
 Matches 50; Conservative 0; Mismatches 0; Indels 2; Gaps 1;

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
          |||
Db      47 FVNQHLCGSHLVEALYLVCGERGFFYTPK--GIVEQCCTSICSLYQLENYCN 96
```

RESULT 5

INHYP

insulin - hamster

RESULT 7

A59151

insulin precursor - jack bean (fragments)

N;Alternate names: hypoglycemic agent; plant insulin

C;Species: Canavalia ensiformis (jack bean)

C;Date: 07-Dec-1999 #sequence_revision 07-Dec-1999 #text_change 10-Dec-1999

C;Accession: B59151; A59151

R;Oliveira, A.E.A.; Machado, O.L.T.; Gomes, V.M.; Xavier-Neto, J.; Pereira, A.C.P.; Vieira, J.G.H.; Fernandes, K.V.S.; Xavier-Filho, J.

Protein Pept. Lett. 6, 15-21, 1999

A;Title: Jack bean seed coat contains a protein with complete sequence homology to bovine insulin.

A;Reference number: A59151

A;Accession: B59151

A;Molecule type: protein

A;Residues: 1-30 <MACB>

A;Cross-references: UNIPROT:Q7M217

A;Accession: A59151

A;Molecule type: protein

A;Residues: 31-51 <MACA>

C;Comment: The two chains are probably produced from the same precursor.

C;Superfamily: insulin

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;1-30/Domain: chain B #status experimental <CHB>

F;31-51/Domain: chain A #status experimental <CHA>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 91.0%; Score 267.5; DB 2; Length 51;

Best Local Similarity 92.3%; Pred. No. 7.3e-24;

Matches 48; Conservative 1; Mismatches 2; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSIKSLYQLENYCN 52

|||||

Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCASVCSLYQLENYCN 51

RESULT 8

IPHU

insulin precursor [validated] - human

N;Alternate names: preproinsulin

C;Species: Homo sapiens (man)

C;Date: 23-Oct-1981 #sequence_revision 23-Oct-1981 #text_change 09-Jul-2004

C;Accession: A93222; A94253; A93216; A94251; A93144; A92075; A91186; I58114; A01579; S58661

R;Bell, G.I.; Pictet, R.L.; Rutter, W.J.; Cordell, B.; Tischer, E.; Goodman, H.M.

Nature 284, 26-32, 1980

A;Title: Sequence of the human insulin gene.

A;Reference number: A93222; MUID:80120725; PMID:6243748

A;Accession: A93222

A;Molecule type: DNA

A;Residues: 1-110 <BEL>

A;Cross-references: UNIPROT:P01308; GB:J00265; NID:g186429; PIDN:AAA59172.1;

PID:g386828

R;Ullrich, A.; Dull, T.J.; Gray, A.; Brosius, J.; Sures, I.

Science 209, 612-615, 1980

A;Title: Genetic variation in the human insulin gene.

A;Reference number: A94253; MUID:80236313; PMID:6248962

A;Accession: A94253

A;Molecule type: DNA

A;Residues: 1-110 <ULL>

A;Cross-references: GB:J00265; NID:gl86429; PIDN:AAA59172.1; PID:g386828

R;Bell, G.I.; Swain, W.F.; Pictet, R.; Cordell, B.; Goodman, H.M.; Rutter, W.J.
Nature 282, 525-527, 1979

A;Title: Nucleotide sequence of a cDNA clone encoding human preproinsulin.

A;Reference number: A93216; MUID:80054779; PMID:503234

A;Accession: A93216

A;Molecule type: mRNA

A;Residues: 1-110 <BEL2>

A;Cross-references: GB:J00265; NID:gl86429; PIDN:AAA59172.1; PID:g386828

R;Sures, I.; Goeddel, D.V.; Gray, A.; Ullrich, A.
Science 208, 57-59, 1980

A;Title: Nucleotide sequence of human preproinsulin complementary DNA.

A;Reference number: A94251; MUID:80147417; PMID:6927840

A;Accession: A94251

A;Molecule type: mRNA

A;Residues: 1-110 <SUR>

A;Cross-references: GB:J00265; NID:gl86429; PIDN:AAA59172.1; PID:g386828

R;Nicol, D.S.H.W.; Smith, L.F.
Nature 187, 483-485, 1960

A;Title: Amino-acid sequence of human insulin.

A;Reference number: A93144

A;Accession: A93144

A;Molecule type: protein

A;Residues: 25-54;90-110 <NIC>

R;Oyer, P.E.; Cho, S.; Peterson, J.D.; Steiner, D.F.
J. Biol. Chem. 246, 1375-1386, 1971

A;Title: Studies on human proinsulin. Isolation and amino acid sequence of the human pancreatic C-peptide.

A;Reference number: A92075; MUID:71116410; PMID:5101771

A;Accession: A92075

A;Molecule type: protein

A;Residues: 57-87 <OYE>

R;Ko, A.; Smyth, D.G.; Markussen, J.; Sundby, F.
Eur. J. Biochem. 20, 190-199, 1971

A;Title: Amino acid sequence of the C-peptide of human proinsulin.

A;Reference number: A91186; MUID:71257722; PMID:5560404

A;Accession: A91186

A;Molecule type: protein

A;Residues: 57-87 <KOA>

R;Lucassen, A.M.; Julier, C.; Beressi, J.P.; Boitard, C.; Froguel, P.; Lathrop, M.; Bell, J.I.

Nature Genet. 4, 305-310, 1993

A;Title: Susceptibility to insulin dependent diabetes mellitus maps to a 4.1 kb segment of DNA spanning the insulin gene and associated VNTR.

A;Reference number: I58114; MUID:93364428; PMID:8358440

A;Accession: I58114

A;Status: preliminary; translated from GB/EMBL/DDBJ

A;Molecule type: DNA

A;Residues: 1-59,63-110 <RES>

A;Cross-references: GB:L15440; NID:g307071; PIDN:AAA59179.1; PID:g307072

R;Sieber, P.; Kamber, B.; Hartmann, A.; Joehl, A.; Riniker, B.; Rittel, W.

Helv. Chim. Acta 57, 2617-2621, 1974
 A;Title: Totalsynthese von Humaninsulin unter gezielter Bildung der Disulfidbindungen.
 A;Reference number: A91636; MUID:75077277; PMID:4443293
 A;Contents: annotation; synthesis
 A;Note: disulfide-bonded human insulin was synthesized; the synthetic hormone was identical with the natural hormone in chemical and biological activities
 A;Note: article in German with English abstract
 R;Naithani, V.K.
 Hoppe-Seyler's Z. Physiol. Chem. 354, 659-672, 1973
 A;Title: The synthesis of C-peptide of human proinsulin.
 A;Reference number: A91658; MUID:75040007; PMID:4803504
 A;Contents: annotation; synthesis of residues 57-87
 R;Geiger, R.; Jaeger, G.; Koenig, W.
 Chem. Ber. 106, 2347-2352, 1973
 A;Title: Synthesis of the complete sequence of human proinsulin C-peptide and its [Glu-9,Gln-11] analogue.
 A;Reference number: A90914
 A;Contents: annotation; synthesis of residues 57-87
 R;Kaufmann, J.E.; Irminger, J.C.; Halban, P.A.
 Biochem. J. 310, 869-874, 1995
 A;Title: Sequence requirements for proinsulin processing at the B-chain/C-peptide junction.
 A;Reference number: S58661; MUID:96013185; PMID:7575420
 A;Contents: annotation; site-directed mutagenesis study of proteolytic processing
 C;Genetics:
 A;Gene: GDB:INS
 A;Cross-references: GDB:119349; OMIM:176730
 A;Map position: 11p15.5-11p15.5
 A;Introns: 63/1
 C;Superfamily: insulin
 C;Keywords: hormone; pancreas
 F;1-24/Domain: signal sequence #status predicted <SIG>
 F;25-54/Domain: insulin chain B #status experimental <BCH>
 F;25-54,90-110/Product: insulin #status experimental <MAT>
 F;57-87/Domain: connecting C peptide #status experimental <CPEP>
 F;90-110/Domain: insulin chain A #status experimental <ACH>
 F;31-96,43-109,95-100/Disulfide bonds: #status experimental

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 1.6e-23;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
          |||
Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGGPGAGSLQPLALEG 84
Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110
  
```

RESULT 9

B42179

insulin precursor - green monkey

C;Species: Cercopithecus aethiops (green monkey, grivet)

C;Date: 04-Mar-1993 #sequence_revision 18-Nov-1994 #text_change 09-Jul-2004
 C;Accession: B42179; A05232; S16494; S22056
 R;Seino, S.; Bell, G.I.; Li, W.H.
 Mol. Biol. Evol. 9, 193-203, 1992
 A;Title: Sequences of primate insulin genes support the hypothesis of a slower rate of molecular evolution in humans and apes than in monkeys.
 A;Reference number: A42179; MUID:92219953; PMID:1560757
 A;Accession: B42179
 A;Molecule type: DNA
 A;Residues: 1-110 <SEI>
 A;Cross-references: UNIPROT:P30407; EMBL:X61092; NID:g22808; PIDN:CAA43405.1; PID:g22809
 A;Note: sequence extracted from NCBI backbone (NCBIN:95185, NCBIP:95194)
 R;Peterson, J.D.; Nehrlich, S.; Oyer, P.E.; Steiner, D.F.
 J. Biol. Chem. 247, 4866-4871, 1972
 A;Title: Determination of the amino acid sequence of the monkey, sheep, and dog proinsulin C-peptides by a semi-micro Edman degradation procedure.
 A;Reference number: A92111; MUID:72258016; PMID:4626369
 A;Accession: A05232
 A;Molecule type: protein
 A;Residues: 57-87 <PET>
 C;Genetics:
 A;Introns: 63/1
 C;Superfamily: insulin
 C;Keywords: hormone; pancreas
 F;1-24/Domain: signal sequence #status predicted <SIG>
 F;25-54/Domain: insulin chain B #status predicted <BCH>
 F;25-54,90-110/Product: insulin #status predicted <MAT>
 F;57-87/Domain: connecting peptide #status experimental <CPEP>
 F;90-110/Domain: insulin chain A #status predicted <ACH>
 F;31-96,43-109,95-100/Disulfide bonds: #status predicted

Query Match 90.8%; Score 267; DB 2; Length 110;
 Best Local Similarity 60.5%; Pred. No. 1.6e-23;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
          |||
Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDPQVGQVELGGGPGAGSLQPLALEG 84
Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110

```

RESULT 10

JQ0178

insulin precursor - crab-eating macaque

C;Species: *Macaca fascicularis* (crab-eating macaque)

C;Date: 07-Sep-1990 #sequence_revision 07-Sep-1990 #text_change 09-Jul-2004

C;Accession: JQ0178

R;Wetekom, W.; Groneberg, J.; Leineweber, M.; Wengenmayer, F.; Winnacker, E.L.
 Gene 19, 179-183, 1982

A;Title: The nucleotide sequence of cDNA coding for preproinsulin from the primate *Macaca fascicularis*.

A;Reference number: JQ0178; MUID:83080474; PMID:6184262

A;Accession: JQ0178

A;Molecule type: mRNA
A;Residues: 1-110 <WET>
A;Cross-references: UNIPROT:P30406; GB:J00336; NID:g342121; PIDN:AAA36849.1;
PID:g342122
C;Superfamily: insulin
F;1-24/Domain: signal sequence #status predicted <SIG>
F;25-54,90-110/Product: insulin #status predicted <MAT>
F;25-54/Domain: insulin chain B #status predicted <BCH>
F;55-89/Domain: insulin connecting C peptide #status predicted <CPT>
F;90-110/Domain: insulin chain A #status predicted <ACH>
F;31-96,43-109,95-100/Disulfide bonds: #status predicted

Query Match 90.8%; Score 267; DB 2; Length 110;
Best Local Similarity 60.5%; Pred. No. 1.6e-23;
Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
          |||
Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDPQVGQVELGGGPGAGSLQPLALEG 84
          |||

Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110
          |||
```

RESULT 11

A42179

insulin precursor - chimpanzee

C;Species: Pan troglodytes (chimpanzee)

C;Date: 04-Mar-1993 #sequence_revision 18-Nov-1994 #text_change 09-Jul-2004

C;Accession: A42179; S22058

R;Seino, S.; Bell, G.I.; Li, W.H.

Mol. Biol. Evol. 9, 193-203, 1992

A;Title: Sequences of primate insulin genes support the hypothesis of a slower rate of molecular evolution in humans and apes than in monkeys.

A;Reference number: A42179; MUID:92219953; PMID:1560757

A;Accession: A42179

A;Status: preliminary

A;Molecule type: DNA

A;Residues: 1-110 <SEI>

A;Cross-references: UNIPROT:P30410; EMBL:X61089; NID:g38251; PIDN:CAA43403.1;
PID:g38252

A;Note: sequence extracted from NCBI backbone (NCBIP:95067)

C;Genetics:

A;Introns: 63/1

C;Superfamily: insulin

Query Match 90.8%; Score 267; DB 2; Length 110;
Best Local Similarity 60.5%; Pred. No. 1.6e-23;
Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
          |||
Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGGPGAGSLQPLALEG 84
          |||

Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
```

Db 85 SLQKRGIVEQCCTSICSLYQLENYCN 110

RESULT 12

INCMA

insulin - Arabian camel (tentative sequence)

C;Species: Camelus dromedarius (Arabian camel)

C;Date: 31-Mar-1992 #sequence_revision 31-Mar-1992 #text_change 09-Jul-2004

C;Accession: A92782

R;Danho, W.O.

J. Fac. Med. Baghdad 14, 16-28, 1972

A;Title: The isolation and characterization of insulin of camel (Camelus dromedarius).

A;Reference number: A92782

A;Accession: A92782

A;Molecule type: protein

A;Residues: 1-30;31-51 <DAN>

A;Cross-references: UNIPROT:P01320

C;Superfamily: insulin

C;Keywords: hormone; pancreas

F;1-30/Domain: insulin chain B #status experimental <BCH>

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;31-51/Domain: insulin chain A #status experimental <ACH>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 89.6%; Score 263.5; DB 1; Length 51;
Best Local Similarity 90.4%; Pred. No. 2.1e-23;
Matches 47; Conservative 1; Mismatches 3; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
| ||||| | : ||||| |
Db 1 FANQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCASVCSLYQLENYCN 51

RESULT 13

INGT

insulin - goat

C;Species: Capra aegagrus hircus (domestic goat)

C;Date: 13-Jul-1981 #sequence_revision 13-Jul-1981 #text_change 09-Jul-2004

C;Accession: A01586

R;Smith, L.F.

Am. J. Med. 40, 662-666, 1966

A;Title: Species variation in the amino acid sequence of insulin.

A;Reference number: A90029; MUID:66160119; PMID:5949593

A;Accession: A01586

A;Molecule type: protein

A;Residues: 1-30;31-51 <SMI>

A;Cross-references: UNIPROT:P01319

C;Superfamily: insulin

C;Keywords: hormone; pancreas

F;1-30/Domain: insulin chain B #status experimental <BCH>

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;31-51/Domain: insulin chain A #status experimental <ACH>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 89.6%; Score 263.5; DB 1; Length 51;
Best Local Similarity 90.4%; Pred. No. 2.1e-23;

Matches 47; Conservative 1; Mismatches 3; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||| :|||||

Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCAGVCSLYQLENYCN 51

RESULT 14

INWH1S

insulin - sei whale

C;Species: Balaenoptera borealis (sei whale)

C;Date: 13-Jul-1981 #sequence_revision 13-Jul-1981 #text_change 09-Jul-2004

C;Accession: A01582

R;Ishihara, Y.; Saito, T.; Ito, Y.; Fujino, M.

Nature 181, 1468-1469, 1958

A;Title: Structure of sperm- and sei-whale insulins and their breakdown by whale pepsin.

A;Reference number: A93142

A;Accession: A01582

A;Molecule type: protein

A;Residues: 1-30;31-51 <ISH>

A;Cross-references: UNIPROT:P01314

C;Superfamily: insulin

C;Keywords: hormone; pancreas

F;1-30/Domain: insulin chain B #status experimental <BCH>

F;1-30,31-51/Product: insulin #status experimental <MAT>

F;31-51/Domain: insulin chain A #status experimental <ACH>

F;7-37,19-50,36-41/Disulfide bonds: #status predicted

Query Match 89.6%; Score 263.5; DB 1; Length 51;

Best Local Similarity 92.3%; Pred. No. 2.1e-23;

Matches 48; Conservative 0; Mismatches 3; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||| | |||||

Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCASTCSLYQLENYCN 51

RESULT 15

IPPG

insulin precursor - pig

C;Species: Sus scrofa domestica (domestic pig)

C;Date: 22-Jun-1981 #sequence_revision 22-Jun-1981 #text_change 16-Jul-1999

C;Accession: A01583; A94572; S16492; A60835; B60835

R;Chance, R.E.; Ellis, R.M.; Bromer, W.W.

Science 161, 165-167, 1968

A;Title: Porcine proinsulin: characterization and amino acid sequence.

A;Reference number: A94240; MUID:68286485; PMID:5657063

A;Accession: A01583

A;Molecule type: protein

A;Residues: 1-34,'Q',36-84 <CHA>

R;Chance, R.E.

submitted to the Atlas, July 1970

A;Reference number: A94572

A;Accession: A94572

A;Molecule type: protein

A;Residues: 1-84 <CH2>

R;Brown, H.; Sanger, F.; Kitai, R.
 Biochem. J. 60, 556-565, 1955
 A;Title: The structure of pig and sheep insulins.
 A;Reference number: A90344
 A;Accession: S16492
 A;Molecule type: protein
 A;Residues: 1-30;31-51 <BRO>
 R;Snel, L.; Damgaard, U.
 Horm. Metab. Res. 20, 476-480, 1988
 A;Title: Proinsulin heterogeneity in pigs.
 A;Reference number: A60835; MUID:89032178; PMID:3181865
 A;Accession: A60835
 A;Molecule type: protein
 A;Residues: 33-38,40-62 <SNE>
 A;Note: the authors report the characterization of a connecting peptide variant lacking Ala-39
 A;Accession: B60835
 A;Molecule type: protein
 A;Residues: 33-62 <SN2>
 R;Blundell, T.; Dodson, G.; Hodgkin, D.; Mercola, D.
 Adv. Protein Chem. 26, 279-402, 1972
 A;Title: Insulin. the structure in the crystal and its reflection in chemistry and biology.
 A;Reference number: A90017
 A;Contents: annotation; X-ray crystallography, 1.9 angstroms
 C;Superfamily: insulin
 C;Keywords: hormone; pancreas
 F;1-30/Domain: insulin chain B #status experimental <BCH>
 F;1-30,64-84/Product: insulin #status experimental <MAT>
 F;33-63/Domain: connecting peptide #status experimental <CPEP>
 F;64-84/Domain: insulin chain A #status experimental <ACH>
 F;7-70,19-83,69-74/Disulfide bonds: #status experimental

Query Match 89.5%; Score 263; DB 1; Length 84;
 Best Local Similarity 60.7%; Pred. No. 3.7e-23;
 Matches 51; Conservative 0; Mismatches 1; Indels 32; Gaps 1;

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Db      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKARREAENPQAGAVELGGGLGGLQALALEGPP 60

Qy      31 ---RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      61 QKRGIVEQCCTSICSLYQLENYCN 84

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Search completed: March 9, 2005, 04:20:10
 Job time : 9.97786 secs

OM protein - protein search, using sw model

Run on: March 9, 2005, 04:18:26 ; Search time 110.044 Seconds
(without alignments)
155.486 Million cell updates/sec

Title: US-10-054-873-5
Perfect score: 294
Sequence: 1 FVNQHLCGSHLVEALYLVCG.....IVEQCCTSICSILYQLENYCN 52

Scoring table: BLOSUM62
Gapop 10.0 , Gapext 0.5

Searched: 1391452 seqs, 329044822 residues

Total number of hits satisfying chosen parameters: 1391452

Minimum DB seq length: 0
Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
Maximum Match 100%
Listing first 45 summaries

Database : Published Applications_AA:*

- 1: /cgn2_6/ptodata/1/pubpaa/US07_PUBCOMB.pep:*
- 2: /cgn2_6/ptodata/1/pubpaa/PCT_NEW_PUB.pep:*
- 3: /cgn2_6/ptodata/1/pubpaa/US06_NEW_PUB.pep:*
- 4: /cgn2_6/ptodata/1/pubpaa/US06_PUBCOMB.pep:*
- 5: /cgn2_6/ptodata/1/pubpaa/US07_NEW_PUB.pep:*
- 6: /cgn2_6/ptodata/1/pubpaa/PCTUS_PUBCOMB.pep:*
- 7: /cgn2_6/ptodata/1/pubpaa/US08_NEW_PUB.pep:*
- 8: /cgn2_6/ptodata/1/pubpaa/US08_PUBCOMB.pep:*
- 9: /cgn2_6/ptodata/1/pubpaa/US09A_PUBCOMB.pep:*
- 10: /cgn2_6/ptodata/1/pubpaa/US09B_PUBCOMB.pep:*
- 11: /cgn2_6/ptodata/1/pubpaa/US09C_PUBCOMB.pep:*
- 12: /cgn2_6/ptodata/1/pubpaa/US09_NEW_PUB.pep:*
- 13: /cgn2_6/ptodata/1/pubpaa/US10A_PUBCOMB.pep:*
- 14: /cgn2_6/ptodata/1/pubpaa/US10B_PUBCOMB.pep:*
- 15: /cgn2_6/ptodata/1/pubpaa/US10C_PUBCOMB.pep:*
- 16: /cgn2_6/ptodata/1/pubpaa/US10D_PUBCOMB.pep:*
- 17: /cgn2_6/ptodata/1/pubpaa/US10_NEW_PUB.pep:*
- 18: /cgn2_6/ptodata/1/pubpaa/US11_NEW_PUB.pep:*
- 19: /cgn2_6/ptodata/1/pubpaa/US60_NEW_PUB.pep:*
- 20: /cgn2_6/ptodata/1/pubpaa/US60_PUBCOMB.pep:*

Pred. No. is the number of results predicted by chance to have a score greater than or equal to the score of the result being printed, and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	Query Match	Length	DB	ID	Description
1	294	100.0	52	13	US-10-054-873-5	Sequence 5, Appli
2	294	100.0	107	13	US-10-054-873-6	Sequence 6, Appli
3	294	100.0	137	16	US-10-101-454-39	Sequence 39, Appl
4	294	100.0	145	16	US-10-101-454-45	Sequence 45, Appl
5	294	100.0	146	16	US-10-101-454-48	Sequence 48, Appl
6	294	100.0	150	13	US-10-054-873-7	Sequence 7, Appli
7	291	99.0	57	17	US-10-869-040-83	Sequence 83, Appl
8	283.5	96.4	58	17	US-10-869-040-84	Sequence 84, Appl
9	282.5	96.1	336	17	US-10-869-040-6	Sequence 6, Appli
10	280	95.2	60	17	US-10-869-040-133	Sequence 133, App
11	278.5	94.7	51	10	US-09-858-935B-5	Sequence 5, Appli
12	278.5	94.7	51	13	US-10-028-410-3	Sequence 3, Appli
13	278.5	94.7	51	14	US-10-444-326-3	Sequence 3, Appli
14	278.5	94.7	51	15	US-10-271-869-5	Sequence 5, Appli
15	278.5	94.7	51	15	US-10-444-262-3	Sequence 3, Appli
16	278.5	94.7	51	15	US-10-444-649-3	Sequence 3, Appli
17	278.5	94.7	51	15	US-10-444-701-3	Sequence 3, Appli
18	275.5	93.7	54	17	US-10-869-040-86	Sequence 86, Appl
19	275.5	93.7	104	16	US-10-101-454-15	Sequence 15, Appl
20	275.5	93.7	124	9	US-09-894-711-18	Sequence 18, Appl
21	275.5	93.7	124	17	US-10-869-040-92	Sequence 92, Appl
22	275.5	93.7	128	17	US-10-869-040-189	Sequence 189, App
23	275.5	93.7	138	9	US-09-861-687-19	Sequence 19, Appl
24	275.5	93.7	138	15	US-10-620-651-19	Sequence 19, Appl
25	275.5	93.7	140	16	US-10-101-454-33	Sequence 33, Appl
26	275.5	93.7	140	16	US-10-101-454-42	Sequence 42, Appl
27	275.5	93.7	314	17	US-10-869-040-4	Sequence 4, Appli
28	275.5	93.7	380	17	US-10-869-040-2	Sequence 2, Appli
29	273	92.9	50	13	US-10-066-009A-3	Sequence 3, Appli
30	273	92.9	50	17	US-10-869-040-85	Sequence 85, Appl
31	273	92.9	96	17	US-10-869-040-128	Sequence 128, App
32	271.5	92.3	102	16	US-10-101-454-36	Sequence 36, Appl
33	267	90.8	86	9	US-09-878-380-1	Sequence 1, Appli
34	267	90.8	86	10	US-09-858-935B-4	Sequence 4, Appli
35	267	90.8	86	13	US-10-028-410-2	Sequence 2, Appli
36	267	90.8	86	13	US-10-054-873-4	Sequence 4, Appli
37	267	90.8	86	14	US-10-444-326-2	Sequence 2, Appli
38	267	90.8	86	15	US-10-271-869-4	Sequence 4, Appli
39	267	90.8	86	15	US-10-444-262-2	Sequence 2, Appli
40	267	90.8	86	15	US-10-444-649-2	Sequence 2, Appli
41	267	90.8	86	15	US-10-444-701-2	Sequence 2, Appli
42	267	90.8	86	17	US-10-760-928-2	Sequence 2, Appli
43	267	90.8	87	17	US-10-869-040-89	Sequence 89, Appl
44	267	90.8	96	9	US-09-947-563-4	Sequence 4, Appli
45	267	90.8	110	9	US-09-205-658-125	Sequence 125, App

ALIGNMENTS

RESULT 1
 US-10-054-873-5
 ; Sequence 5, Application US/10054873
 ; Publication No. US20020164712A1


```

;      NUMBER OF SEQUENCES: 7
;      CORRESPONDENCE ADDRESS:
;          ADDRESSEE: Townsend and Townsend and Crew LLP
;          STREET: Two Embarcadero Center, Eighth Floor
;          CITY: San Francisco
;          STATE: California
;          COUNTRY: USA
;          ZIP: 94111-3834
;      COMPUTER READABLE FORM:
;          MEDIUM TYPE: Floppy disk
;          COMPUTER: IBM PC compatible
;          OPERATING SYSTEM: PC-DOS/MS-DOS
;          SOFTWARE: PatentIn Release #1.0, Version #1.30
;      CURRENT APPLICATION DATA:
;          APPLICATION NUMBER: US/10/054,873
;          FILING DATE: 22-Jan-2002
;          CLASSIFICATION: <Unknown>
;      PRIOR APPLICATION DATA:
;          APPLICATION NUMBER: WO PCT/CN98/00052
;          FILING DATE: 31-MAR-1998
;          APPLICATION NUMBER: US 09/423,100
;          FILING DATE: 11-DEC-2000
;      ATTORNEY/AGENT INFORMATION:
;          NAME: Mycroft, Frank J
;          REGISTRATION NUMBER: 46,946
;          REFERENCE/DOCKET NUMBER: 020167-000130US
;      INFORMATION FOR SEQ ID NO: 6:
;          SEQUENCE CHARACTERISTICS:
;              LENGTH: 107 amino acids
;              TYPE: amino acid
;              STRANDEDNESS: <Unknown>
;              TOPOLOGY: linear
;          MOLECULE TYPE: protein
;          SEQUENCE DESCRIPTION: SEQ ID NO: 6:
US-10-054-873-6

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Query Match          100.0%;  Score 294;  DB 13;  Length 107;
Best Local Similarity 100.0%;  Pred. No. 1.2e-27;
Matches    52;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        |||
Db      56 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 107

```

```

RESULT 3
US-10-101-454-39
; Sequence 39, Application US/10101454
; Publication No. US20040110664A1
;   GENERAL INFORMATION:
;       APPLICANT: Havelund, Svend
;               Halstrom, John
;               Jonassen, Ib
;               Andersen, Asser Sloth
;               Markussen, Jan
;       TITLE OF INVENTION: ACYLATED INSULIN
;       NUMBER OF SEQUENCES: 49

```

; CORRESPONDENCE ADDRESS:
 ; ADDRESSEE: Novo Nordisk of North America, Inc.
 ; STREET: 405 Lexington Avenue, 64th Floor
 ; CITY: New York
 ; STATE: New York
 ; COUNTRY: United States of America
 ; ZIP: 10174-6401
 ; COMPUTER READABLE FORM:
 ; MEDIUM TYPE: Floppy disk
 ; COMPUTER: IBM PC compatible
 ; OPERATING SYSTEM: PC-DOS/MS-DOS
 ; SOFTWARE: PatentIn Release #1.0, Version #1.25
 ; CURRENT APPLICATION DATA:
 ; APPLICATION NUMBER: US/10/101,454
 ; FILING DATE: 20-Mar-2002
 ; CLASSIFICATION: <Unknown>
 ; PRIOR APPLICATION DATA:
 ; APPLICATION NUMBER: 08/400,256
 ; FILING DATE: 03-MAR-1995
 ; ATTORNEY/AGENT INFORMATION:
 ; NAME: Lambiris, Elias J.
 ; REGISTRATION NUMBER: 33,728
 ; REFERENCE/DOCKET NUMBER: 3985.220-US
 ; TELECOMMUNICATION INFORMATION:
 ; TELEPHONE: 212-867-0123
 ; TELEFAX: 212-878-9655
 ; INFORMATION FOR SEQ ID NO: 39:
 ; SEQUENCE CHARACTERISTICS:
 ; LENGTH: 137 amino acids
 ; TYPE: amino acid
 ; TOPOLOGY: linear
 ; MOLECULE TYPE: protein
 ; SEQUENCE DESCRIPTION: SEQ ID NO: 39:
 US-10-101-454-39

Query Match 100.0%; Score 294; DB 16; Length 137;
 Best Local Similarity 100.0%; Pred. No. 1.6e-27;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 86 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 137

RESULT 4
 US-10-101-454-45
 ; Sequence 45, Application US/10101454
 ; Publication No. US20040110664A1
 ; GENERAL INFORMATION:
 ; APPLICANT: Havelund, Svend
 ; Halstrom, John
 ; Jonassen, Ib
 ; Andersen, Asser Sloth
 ; Markussen, Jan
 ; TITLE OF INVENTION: ACYLATED INSULIN
 ; NUMBER OF SEQUENCES: 49
 ; CORRESPONDENCE ADDRESS:

; ADDRESSEE: Novo Nordisk of North America, Inc.
 ; STREET: 405 Lexington Avenue, 64th Floor
 ; CITY: New York
 ; STATE: New York
 ; COUNTRY: United States of America
 ; ZIP: 10174-6401
 ; COMPUTER READABLE FORM:
 ; MEDIUM TYPE: Floppy disk
 ; COMPUTER: IBM PC compatible
 ; OPERATING SYSTEM: PC-DOS/MS-DOS
 ; SOFTWARE: PatentIn Release #1.0, Version #1.25
 ; CURRENT APPLICATION DATA:
 ; APPLICATION NUMBER: US/10/101,454
 ; FILING DATE: 20-Mar-2002
 ; CLASSIFICATION: <Unknown>
 ; PRIOR APPLICATION DATA:
 ; APPLICATION NUMBER: 08/400,256
 ; FILING DATE: 03-MAR-1995
 ; ATTORNEY/AGENT INFORMATION:
 ; NAME: Lambiris, Elias J.
 ; REGISTRATION NUMBER: 33,728
 ; REFERENCE/DOCKET NUMBER: 3985.220-US
 ; TELECOMMUNICATION INFORMATION:
 ; TELEPHONE: 212-867-0123
 ; TELEFAX: 212-878-9655
 ; INFORMATION FOR SEQ ID NO: 45:
 ; SEQUENCE CHARACTERISTICS:
 ; LENGTH: 145 amino acids
 ; TYPE: amino acid
 ; TOPOLOGY: linear
 ; MOLECULE TYPE: protein
 ; SEQUENCE DESCRIPTION: SEQ ID NO: 45:
 US-10-101-454-45

Query Match 100.0%; Score 294; DB 16; Length 145;
 Best Local Similarity 100.0%; Pred. No. 1.6e-27;
 Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||||||||||||||||||||||||||||||||||||||||||
 Db 94 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 145

RESULT 5

US-10-101-454-48

; Sequence 48, Application US/10101454
 ; Publication No. US20040110664A1
 ; GENERAL INFORMATION:
 ; APPLICANT: Havelund, Svend
 ; Halstrom, John
 ; Jonassen, Ib
 ; Andersen, Asser Sloth
 ; Markussen, Jan
 ; TITLE OF INVENTION: ACYLATED INSULIN
 ; NUMBER OF SEQUENCES: 49
 ; CORRESPONDENCE ADDRESS:
 ; ADDRESSEE: Novo Nordisk of North America, Inc.

```

; STREET: 405 Lexington Avenue, 64th Floor
; CITY: New York
; STATE: New York
; COUNTRY: United States of America
; ZIP: 10174-6401
; COMPUTER READABLE FORM:
; MEDIUM TYPE: Floppy disk
; COMPUTER: IBM PC compatible
; OPERATING SYSTEM: PC-DOS/MS-DOS
; SOFTWARE: PatentIn Release #1.0, Version #1.25
; CURRENT APPLICATION DATA:
; APPLICATION NUMBER: US/10/101,454
; FILING DATE: 20-Mar-2002
; CLASSIFICATION: <Unknown>
; PRIOR APPLICATION DATA:
; APPLICATION NUMBER: 08/400,256
; FILING DATE: 03-MAR-1995
; ATTORNEY/AGENT INFORMATION:
; NAME: Lambiris, Elias J.
; REGISTRATION NUMBER: 33,728
; REFERENCE/DOCKET NUMBER: 3985.220-US
; TELECOMMUNICATION INFORMATION:
; TELEPHONE: 212-867-0123
; TELEFAX: 212-878-9655
; INFORMATION FOR SEQ ID NO: 48:
; SEQUENCE CHARACTERISTICS:
; LENGTH: 146 amino acids
; TYPE: amino acid
; TOPOLOGY: linear
; MOLECULE TYPE: protein
; SEQUENCE DESCRIPTION: SEQ ID NO: 48:
US-10-101-454-48

```

```

Query Match          100.0%; Score 294; DB 16; Length 146;
Best Local Similarity 100.0%; Pred. No. 1.7e-27;
Matches 52; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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```

Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
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Db      95 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 146

```

RESULT 6

US-10-054-873-7

```

; Sequence 7, Application US/10054873
; Publication No. US20020164712A1
; GENERAL INFORMATION:
; APPLICANT: Gan, Zhong Ru
; TITLE OF INVENTION: Chimeric Protein Containing an
;                      Intramolecular Chaperone-Like Sequence
; NUMBER OF SEQUENCES: 7
; CORRESPONDENCE ADDRESS:
; ADDRESSEE: Townsend and Townsend and Crew LLP
; STREET: Two Embarcadero Center, Eighth Floor
; CITY: San Francisco
; STATE: California
; COUNTRY: USA

```



```

;           ZIP: 94111-3834
;   COMPUTER READABLE FORM:
;           MEDIUM TYPE: Floppy disk
;           COMPUTER: IBM PC compatible
;           OPERATING SYSTEM: PC-DOS/MS-DOS
;           SOFTWARE: PatentIn Release #1.0, Version #1.30
;   CURRENT APPLICATION DATA:
;           APPLICATION NUMBER: US/10/054,873
;           FILING DATE: 22-Jan-2002
;           CLASSIFICATION: <Unknown>
;   PRIOR APPLICATION DATA:
;           APPLICATION NUMBER: WO PCT/CN98/00052
;           FILING DATE: 31-MAR-1998
;           APPLICATION NUMBER: US 09/423,100
;           FILING DATE: 11-DEC-2000
;   ATTORNEY/AGENT INFORMATION:
;           NAME: Mycroft, Frank J
;           REGISTRATION NUMBER: 46,946
;           REFERENCE/DOCKET NUMBER: 020167-000130US
;   INFORMATION FOR SEQ ID NO: 7:
;           SEQUENCE CHARACTERISTICS:
;           LENGTH: 150 amino acids
;           TYPE: amino acid
;           STRANDEDNESS: <Unknown>
;           TOPOLOGY: linear
;           MOLECULE TYPE: protein
;           SEQUENCE DESCRIPTION: SEQ ID NO: 7:
US-10-054-873-7

```

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Query Match          100.0%;  Score 294;  DB 13;  Length 150;
Best Local Similarity 100.0%;  Pred. No. 1.7e-27;
Matches    52;  Conservative    0;  Mismatches    0;  Indels    0;  Gaps    0;

```

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        ||||||||||||||||||||||||||||||||||||||||||||||||||||
Db      99 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 150

```

```

RESULT 7
US-10-869-040-83
; Sequence 83, Application US/10869040
; Publication No. US20050039235A1
; GENERAL INFORMATION:
;   APPLICANT: Moloney, Maurice M.
;   APPLICANT: Boothe, Joseph
;   APPLICANT: Keon, Richard
;   APPLICANT: Nykiforuk, Cory
;   APPLICANT: Van Rooijen, Gijs
;   TITLE OF INVENTION: Methods for the Production of Insulin in Plants
;   FILE REFERENCE: 9369-301
;   CURRENT APPLICATION NUMBER: US/10/869,040
;   CURRENT FILING DATE: 2004-06-17
;   PRIOR APPLICATION NUMBER: 60/478,818
;   PRIOR FILING DATE: 2003-06-17
;   PRIOR APPLICATION NUMBER: 60/549,539
;   PRIOR FILING DATE: 2004-03-04
;   NUMBER OF SEQ ID NOS: 196

```

```
; SOFTWARE: PatentIn version 3.1
; SEQ ID NO 83
; LENGTH: 57
; TYPE: PRT
; ORGANISM: Artificial Sequence
; FEATURE:
; OTHER INFORMATION: Proinsulin
US-10-869-040-83
```

Query Match 99.0%; Score 291; DB 17; Length 57;
Best Local Similarity 98.1%; Pred. No. 1.5e-27;
Matches 51; Conservative 1; Mismatches 0; Indels 0; Gaps 0;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
| | | | | | | | | | | | | | | | | | : | | | | | | | | | | | |
Db 6 FVNQHLCGSHLVEALYLVCGERGFFYTPKTKGIVEQCCTSICSLYQLENYCN 57

RESULT 8

US-10-869-040-84

```

; Sequence 84, Application US/10869040
; Publication No. US20050039235A1
; GENERAL INFORMATION:
; APPLICANT: Moloney, Maurice M.
; APPLICANT: Boothe, Joseph
; APPLICANT: Keon, Richard
; APPLICANT: Nykiforuk, Cory
; APPLICANT: Van Rooijen, Gijs
; TITLE OF INVENTION: Methods for the Production of Insulin in Plants
; FILE REFERENCE: 9369-301
; CURRENT APPLICATION NUMBER: US/10/869,040
; CURRENT FILING DATE: 2004-06-17
; PRIOR APPLICATION NUMBER: 60/478,818
; PRIOR FILING DATE: 2003-06-17
; PRIOR APPLICATION NUMBER: 60/549,539
; PRIOR FILING DATE: 2004-03-04
; NUMBER OF SEQ ID NOS: 196
; SOFTWARE: PatentIn version 3.1
; SEQ ID NO 84
; LENGTH: 58
; TYPE: PRT
; ORGANISM: Artificial Sequence
; FEATURE:
; OTHER INFORMATION: Insulin
US-10-869-040-84

```

Query Match 96.4%; Score 283.5; DB 17; Length 58;
Best Local Similarity 98.1%; Pred. No. 1.2e-26;
Matches 52; Conservative 0; Mismatches 0; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-RGIVEQCCTSICSLYQLENYCN 52
|||||
Db 6 FVNQHLCGSHLVEALYLVCGERGFFYTPKTKRGIVEQCCTSICSLYQLENYCN 58

RESULT 9

US-10-869-040-6

```
; Sequence 6, Application US/10869040
; Publication No. US20050039235A1
; GENERAL INFORMATION:
; APPLICANT: Moloney, Maurice M.
; APPLICANT: Boothe, Joseph
; APPLICANT: Keon, Richard
; APPLICANT: Nykiforuk, Cory
; APPLICANT: Van Rooijen, Gijs
; TITLE OF INVENTION: Methods for the Production of Insulin in Plants
; FILE REFERENCE: 9369-301
; CURRENT APPLICATION NUMBER: US/10/869,040
; CURRENT FILING DATE: 2004-06-17
; PRIOR APPLICATION NUMBER: 60/478,818
; PRIOR FILING DATE: 2003-06-17
; PRIOR APPLICATION NUMBER: 60/549,539
; PRIOR FILING DATE: 2004-03-04
; NUMBER OF SEQ ID NOS: 196
; SOFTWARE: PatentIn version 3.1
; SEQ ID NO 6
; LENGTH: 336
; TYPE: PRT
; ORGANISM: Artificial Sequence
; FEATURE:
; OTHER INFORMATION: Insulin fusion protein
US-10-869-040-6
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```
Query Match          96.1%; Score 282.5; DB 17; Length 336;
Best Local Similarity 94.5%; Pred. No. 9.2e-26;
Matches    52; Conservative    0; Mismatches    0; Indels    3; Gaps    1;
```

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT---RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      26 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRRKRKRGIVEQCCTSICSLYQLENYCN 80
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RESULT 10

```
US-10-869-040-133
; Sequence 133, Application US/10869040
; Publication No. US20050039235A1
; GENERAL INFORMATION:
; APPLICANT: Moloney, Maurice M.
; APPLICANT: Boothe, Joseph
; APPLICANT: Keon, Richard
; APPLICANT: Nykiforuk, Cory
; APPLICANT: Van Rooijen, Gijs
; TITLE OF INVENTION: Methods for the Production of Insulin in Plants
; FILE REFERENCE: 9369-301
; CURRENT APPLICATION NUMBER: US/10/869,040
; CURRENT FILING DATE: 2004-06-17
; PRIOR APPLICATION NUMBER: 60/478,818
; PRIOR FILING DATE: 2003-06-17
; PRIOR APPLICATION NUMBER: 60/549,539
; PRIOR FILING DATE: 2004-03-04
; NUMBER OF SEQ ID NOS: 196
; SOFTWARE: PatentIn version 3.1
; SEQ ID NO 133
; LENGTH: 60
```

; TYPE: PRT
; ORGANISM: Artificial Sequence
; FEATURE:
; OTHER INFORMATION: Mini-proinsulin
US-10-869-040-133

Query Match 95.2%; Score 280; DB 17; Length 60;
Best Local Similarity 86.7%; Pred. No. 3.3e-26;
Matches 52; Conservative 0; Mismatches 0; Indels 8; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-----RGIVEQCCTSICSLYQLENYCN 52
|||||
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRRYPGDVKGIVEQCCTSICSLYQLENYCN 60
|||||

RESULT 11

US-09-858-935B-5

; Sequence 5, Application US/09858935B
; Publication No. US20030069177A1
; GENERAL INFORMATION:
; APPLICANT: Dubaquier, Yves
; APPLICANT: Filvaroff, Ellen
; APPLICANT: Lowman, Henry B.
; TITLE OF INVENTION: METHOD FOR TREATING CARTILAGE DISORDERS
; FILE REFERENCE: P1794R1
; CURRENT APPLICATION NUMBER: US/09/858,935B
; CURRENT FILING DATE: 2002-07-02
; PRIOR APPLICATION NUMBER: US 60/248,985
; PRIOR FILING DATE: 2000-11-15
; PRIOR APPLICATION NUMBER: US 60/204,490
; PRIOR FILING DATE: 2000-05-16
; NUMBER OF SEQ ID NOS: 153
; SEQ ID NO 5
; LENGTH: 51
; TYPE: PRT
; ORGANISM: Homo sapiens
US-09-858-935B-5

Query Match 94.7%; Score 278.5; DB 10; Length 51;
Best Local Similarity 98.1%; Pred. No. 4.2e-26;
Matches 51; Conservative 0; Mismatches 0; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
|||||
Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-GIVEQCCTSICSLYQLENYCN 51
|||||

RESULT 12

US-10-028-410-3

; Sequence 3, Application US/10028410
; Publication No. US20020160955A1
; GENERAL INFORMATION:
; APPLICANT: Dubaquier, Yves
; APPLICANT: Lowman, Henry
; TITLE OF INVENTION: PROTEIN VARIANTS
; FILE REFERENCE: P1712R1-1
; CURRENT APPLICATION NUMBER: US/10/028,410


```
; APPLICANT: Lowman, Henry B.
; TITLE OF INVENTION: METHOD FOR TREATING CARTILAGE DISORDERS
; FILE REFERENCE: P1794R1
; CURRENT APPLICATION NUMBER: US/10/271,869
; CURRENT FILING DATE: 2002-10-16
; PRIOR APPLICATION NUMBER: US/09/858,935
; PRIOR FILING DATE: 2002-07-02
; PRIOR APPLICATION NUMBER: US 60/248,985
; PRIOR FILING DATE: 2000-11-15
; PRIOR APPLICATION NUMBER: US 60/204,490
; PRIOR FILING DATE: 2000-05-16
; NUMBER OF SEQ ID NOS: 153
; SEQ ID NO 5
; LENGTH: 51
; TYPE: PRT
; ORGANISM: Homo sapiens
US-10-271-869-5
```

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Query Match          94.7%; Score 278.5; DB 15; Length 51;
Best Local Similarity 98.1%; Pred. No. 4.2e-26;
Matches 51; Conservative 0; Mismatches 0; Indels 1; Gaps 1;
```

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        |||
Db      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-GIVEQCCTSICSLYQLENYCN 51
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RESULT 15

```
US-10-444-262-3
; Sequence 3, Application US/10444262
; Publication No. US20040023883A1
; GENERAL INFORMATION:
; APPLICANT: Dubaquier, Yves
; APPLICANT: Lowman, Henry
; TITLE OF INVENTION: PROTEIN VARIANTS
; FILE REFERENCE: P1712R1
; CURRENT APPLICATION NUMBER: US/10/444,262
; CURRENT FILING DATE: 2003-05-22
; PRIOR APPLICATION NUMBER: US/09/724,478
; PRIOR FILING DATE: 2000-11-28
; PRIOR APPLICATION NUMBER: US/09/477,923
; PRIOR FILING DATE: 2000-01-05
; NUMBER OF SEQ ID NOS: 6
; SEQ ID NO 3
; LENGTH: 51
; TYPE: PRT
; ORGANISM: Homo sapiens
US-10-444-262-3
```

```
Query Match          94.7%; Score 278.5; DB 15; Length 51;
Best Local Similarity 98.1%; Pred. No. 4.2e-26;
Matches 51; Conservative 0; Mismatches 0; Indels 1; Gaps 1;
```

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
        |||
Db      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-GIVEQCCTSICSLYQLENYCN 51
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Search completed: March 9, 2005, 05:12:21
Job time : 111.044 secs

OM protein - protein search, using sw model

Run on: March 9, 2005, 01:51:08 ; Search time 45.6679 Seconds
 (without alignments)
 583.082 Million cell updates/sec

Title: US-10-054-873-5
 Perfect score: 294
 Sequence: 1 FVNQHLCGSHLVEALYLVCG.....IVEQCCTSICSLYQLENYCN 52

Scoring table: BLOSUM62
 Gapop 10.0 , Gapext 0.5

Searched: 1612378 seqs, 512079187 residues

Total number of hits satisfying chosen parameters: 1612378

Minimum DB seq length: 0
 Maximum DB seq length: 2000000000

Post-processing: Minimum Match 0%
 Maximum Match 100%
 Listing first 45 summaries

Database : UniProt_03:*
 1: uniprot_sprot:*
 2: uniprot_trembl:*

Pred. No. is the number of results predicted by chance to have a
 score greater than or equal to the score of the result being printed,
 and is derived by analysis of the total score distribution.

SUMMARIES

Result No.	Score	% Query		DB	ID	Description
		Match	Length			
1	273.5	93.0	51	1	INS_BALPH	P67973 balaenopter
2	273.5	93.0	51	1	INS_ELEMA	P01316 elephas max
3	273.5	93.0	51	1	INS_PHYCA	P67974 physeter ca
4	273	92.9	96	2	Q7M0U6	Q7m0u6 bacillus br
5	271.5	92.3	51	2	Q7M0G1	Q7m0g1 cricetidae
6	268.5	91.3	51	1	INS_ACOCA	P01324 acomys cahi
7	267.5	91.0	51	2	Q7M217	Q7m217 canavalialpha
8	267	90.8	110	1	INS_CERAE	P30407 cercopithec
9	267	90.8	110	1	INS_GORGO	Q6yk33 gorilla gor
10	267	90.8	110	1	INS_HUMAN	P01308 homo sapien
11	267	90.8	110	1	INS_MACFA	P30406 macaca fasc
12	267	90.8	110	1	INS_PANTR	P30410 pan troglod
13	267	90.8	110	1	INS_PONPY	Q8hxx2 pongo pygma
14	263.5	89.6	51	1	INS_BALBO	P01314 balaenopter
15	263.5	89.6	51	1	INS_CAMDR	P01320 camelus dro

16	263.5	89.6	51	1	INS_CAPHI	P01319	capra hircu
17	263	89.5	108	1	INS_PIG	P01315	sus scrofa
18	263	89.5	110	1	INS_RABIT	P01311	oryctolagus
19	263	89.5	110	1	INS_SPETR	Q91xi3	spermophilu
20	262.5	89.3	51	1	INS_FELCA	P06306	felis silve
21	262	89.1	110	1	INS_CANFA	P01321	canis famil
22	261.5	88.9	51	1	INS_SAISC	P67971	saimiri sci
23	260	88.4	110	1	INS_CRILO	P01313	cricetulus
24	258.5	87.9	105	1	INS_BOVIN	P01317	bos taurus
25	257	87.4	110	1	INS_PSAOB	Q62587	psammomys o
26	256.5	87.2	51	1	INS_DIDMA	P18109	didelphis m
27	254.5	86.6	105	1	INS_SHEEP	P01318	ovis aries
28	252	85.7	86	1	INS_HORSE	P01310	equus cabal
29	251.5	85.5	51	1	INS_CHIBR	P01327	chinchilla
30	251	85.4	108	1	INS_AOTTR	P67972	aotus trivi
31	251	85.4	110	2	Q8WNW6	Q8wnw6	felis silve
32	250	85.0	108	1	INS1_MOUSE	P01325	mus musculu
33	249	84.7	110	1	INS1_RAT	P01322	rattus norv
34	248.5	84.5	51	1	INS_ANSAN	P68245	anser anser
35	248.5	84.5	51	1	INS_CAIMO	P68243	cairina mos
36	248	84.4	110	1	INS2_MOUSE	P01326	mus musculu
37	248	84.4	110	1	INS2_RAT	P01323	rattus norv
38	246	83.7	52	1	INS_ACIGU	P81423	acipenser g
39	246	83.7	52	2	Q7LZN0	Q7lzn0	polyodon sp
40	244.5	83.2	51	1	INS_HYSCR	P01328	hystrix cri
41	244.5	83.2	51	1	INS_MELGA	P67968	meleagris g
42	244.5	83.2	51	1	INS_STRCA	P67969	struthio ca
43	244.5	83.2	51	1	INS_TRASC	P31887	trachemys s
44	238.5	81.1	103	1	INS_SELRF	P51463	selasphorus
45	238	81.0	52	2	Q7LZM9	Q7lzm9	amphiuma tr

ALIGNMENTS

RESULT 1

INS_BALPH

ID INS_BALPH STANDARD; PRT; 51 AA.

AC P67973; P01312;

DT 21-JUL-1986 (Rel. 01, Created)

DT 21-JUL-1986 (Rel. 01, Last sequence update)

DT 25-OCT-2004 (Rel. 45, Last annotation update)

DE Insulin.

GN Name=INS;

OS Balaenoptera physalus (Finback whale) (Common rorqual).

OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;

OC Mammalia; Eutheria; Cetartiodactyla; Cetacea; Mysticeti;

OC Balaenopteridae; Balaenoptera.

OX NCBI_TaxID=9770;

RN [1]

RP SEQUENCE.

RX PubMed=14228503;

RA Hama H., Titani K., Sakaki S., Narita K.;

RT "The amino acid sequence in fin-whale insulin.";

RL J. Biochem. 56:285-293(1964).

CC -!- FUNCTION: Insulin decreases blood glucose concentration. It

CC increases cell permeability to monosaccharides, amino acids and

CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 DR PIR; A91918; INWHF.
 DR HSSP; P01317; IAPH.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR PRINTS; PR00277; INSULINB.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family.
 FT CHAIN 1 30 Insulin B chain.
 FT NON_CONS 30 31
 FT CHAIN 31 51 Insulin A chain.
 FT DISULFID 7 37 Interchain.
 FT DISULFID 19 50 Interchain.
 FT DISULFID 36 41
 SQ SEQUENCE 51 AA; 5766 MW; 9007B514691A7CDD CRC64;

Query Match 93.0%; Score 273.5; DB 1; Length 51;
 Best Local Similarity 96.2%; Pred. No. 5.1e-26;
 Matches 50; Conservative 0; Mismatches 1; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCTSICSLYQLENYCN 51

RESULT 2

INS_ELEMA

ID INS_ELEMA STANDARD; PRT; 51 AA.
 AC P01316;
 DT 21-JUL-1986 (Rel. 01, Created)
 DT 21-JUL-1986 (Rel. 01, Last sequence update)
 DT 05-JUL-2004 (Rel. 44, Last annotation update)
 DE Insulin.
 GN Name=INS;
 OS Elephas maximus (Indian elephant).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Proboscidea; Elephantidae; Elephas.
 OX NCBI_TaxID=9783;
 RN [1]
 RP SEQUENCE.
 RX MEDLINE=66160119; PubMed=5949593; DOI=10.1016/0002-9343(66)90145-8;
 RA Smith L.F.;
 RT "Species variation in the amino acid sequence of insulin."
 RL Am. J. Med. 40:662-666(1966).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.

CC -!- MISCELLANEOUS: The species of elephant is not given, but it is
 CC most probably the indian elephant (*Elephas maximus*).
 CC -!- SIMILARITY: Belongs to the insulin family.
 DR HSSP; P01308; 1AI0.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR PRINTS; PR00277; INSULINB.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family.
 FT CHAIN 1 30 Insulin B chain.
 FT NON_CONS 30 31
 FT CHAIN 31 51 Insulin A chain.
 FT DISULFID 7 37 Interchain.
 FT DISULFID 19 50 Interchain.
 FT DISULFID 36 41
 SQ SEQUENCE 51 AA; 5752 MW; 9007B50CDB457D6D CRC64;

Query Match 93.0%; Score 273.5; DB 1; Length 51;
 Best Local Similarity 94.2%; Pred. No. 5.1e-26;
 Matches 49; Conservative 1; Mismatches 1; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||| :|||
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT-GIVEQCCTGVCSLYQLENYCN 51

RESULT 3

INS_PHYCA

ID INS_PHYCA STANDARD; PRT; 51 AA.
 AC P67974; P01312;
 DT 21-JUL-1986 (Rel. 01, Created)
 DT 21-JUL-1986 (Rel. 01, Last sequence update)
 DT 25-OCT-2004 (Rel. 45, Last annotation update)
 DE Insulin.
 GN Name=INS;
 OS *Physeter catodon* (Sperm whale) (*Physeter macrocephalus*).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Cetartiodactyla; Cetacea; Odontoceti;
 OC Physeteridae; *Physeter*.
 OX NCBI_TaxID=9755;
 RN [1]
 RP SEQUENCE.
 RX PubMed=13373434;
 RA Harris J.I., Sanger F., Naughton M.A.;
 RT "Species differences in insulin."
 RL Arch. Biochem. Biophys. 65:427-438(1956).
 RN [2]
 RP SEQUENCE.
 RX PubMed=13552701;
 RA Ishihara Y., Saito T., Ito Y., Fujino M.;
 RT "Structure of sperm- and sei-whale insulins and their breakdown by
 RT whale pepsin."
 RL Nature 181:1468-1469(1958).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate

CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 DR PIR; A93142; INWHP.
 DR HSSP; P01317; IAPH.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR PRINTS; PR00277; INSULINB.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family.
 FT CHAIN 1 30 Insulin B chain.
 FT NON_CONS 30 31
 FT CHAIN 31 51 Insulin A chain.
 FT DISULFID 7 37 Interchain.
 FT DISULFID 19 50 Interchain.
 FT DISULFID 36 41
 SQ SEQUENCE 51 AA; 5766 MW; 9007B514691A7CDD CRC64;

Query Match 93.0%; Score 273.5; DB 1; Length 51;
 Best Local Similarity 96.2%; Pred. No. 5.1e-26;
 Matches 50; Conservative 0; Mismatches 1; Indels 1; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCTSICSLYQLENYCN 51

RESULT 4

Q7MOU6

ID Q7MOU6 PRELIMINARY; PRT; 96 AA.
 AC Q7MOU6;
 DT 01-MAR-2004 (TrEMBLrel. 26, Created)
 DT 01-MAR-2004 (TrEMBLrel. 26, Last sequence update)
 DT 01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
 DE Epidermal growth factor/single chain insulin fusion protein
 DE (Fragment).
 OS Bacillus brevis (Brevibacillus brevis).
 OC Bacteria; Firmicutes; Bacillales; Paenibacillaceae; Brevibacillus.
 OX NCBI_TaxID=1393;
 RN [1]
 RP SEQUENCE FROM N.A.
 RX MEDLINE=20335834; PubMed=10879487;
 RA Koh M., Hanagata H., Ebisu S., Morihara K., Takagi H.;
 RT "Use of Bacillus brevis for synthesis and secretion of Des-B30 single-
 RT chain human insulin precursor."
 RL Biosci. Biotechnol. Biochem. 64:1079-1081(2000).
 DR PIR; PC7082; PC7082.
 DR HSSP; P01308; IEFE.
 DR GO; GO:0005576; C:extracellular; IEA.
 DR GO; GO:0005179; F:hormone activity; IEA.
 DR GO; GO:0007582; P:physiological process; IEA.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR Pfam; PF00049; Insulin; 1.
 DR PRINTS; PR00277; INSULINB.

Query Match 92.9%; Score 273; DB 2; Length 96;
Best Local Similarity 96.2%; Pred. No. 1.1e-25;
Matches 50; Conservative 0; Mismatches 0; Indels 2; Gaps 1;

RESULT 5

```

ID      Q7MOG1      PRELIMINARY;      PRT;      51 AA.
AC      Q7MOG1;
DT      01-MAR-2004 (TrEMBLrel. 26, Created)
DT      01-MAR-2004 (TrEMBLrel. 26, Last sequence update)
DT      01-MAR-2004 (TrEMBLrel. 26, Last annotation update)
DE      Insulin.
OS      Cricetidae sp. (Hamster).
OC      Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC      Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Cricetinae.
OX      NCBI_TaxID=36483;
RN      [1]
RP      SEQUENCE.
RA      Neelon F.A., Delcher H.K., Steinman H., Lebovitz H.E.;
RT      "Structure of hamster insulin: comparison with a tumor insulin.";
RL      Fed. Proc. 32:300-300(1973).
CC      -!- SUBCELLULAR LOCATION: Secreted (By similarity).
CC      -!- SIMILARITY: Belongs to the insulin family.
DR      PIR; A91456; A91456.
DR      HSSP; P01308; 1EV6.
DR      GO; GO:0005576; C:extracellular; IEA.
DR      GO; GO:0005179; F:hormone activity; IEA.
DR      GO; GO:0007582; P:physiological process; IEA.
DR      InterPro; IPR004825; Ins/IGF/relax.
DR      Pfam; PF00049; Insulin; 1.
DR      PRINTS; PR00277; INSULINB.
DR      PROSITE; PS00262; INSULIN; 1.
KW      Insulin family.
SQ      SEQUENCE      51 AA;  5768 MW;  90066E6469047D3D CRC64;

```

Query Match 92.3%; Score 271.5; DB 2; Length 51;
Best Local Similarity 94.2%; Pred. No. 9e-26;
Matches 49; Conservative 2; Mismatches 0; Indels 1; Gaps 1;

RESULT 6

ID - INS ACOCA STANDARD; PRT; 51 AA.

AC P01324;
 DT 21-JUL-1986 (Rel. 01, Created)
 DT 21-JUL-1986 (Rel. 01, Last sequence update)
 DT 05-JUL-2004 (Rel. 44, Last annotation update)
 DE Insulin.
 GN Name=INS;
 OS *Acomys cahirinus* (Egyptian spiny mouse).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Acomys*.
 OX NCBI_TaxID=10068;
 RN [1]
 RP PRELIMINARY SEQUENCE.
 RX MEDLINE=72189454; PubMed=5028210;
 RA Buenzli H.F., Humbel R.E.;
 RT "Isolation and partial structural analysis of insulin from mouse (*Mus musculus*) and spiny mouse (*Acomys cahirinus*).";
 RL Hoppe-Seyler's Z. Physiol. Chem. 353:444-450(1972).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 DR PIR; A01591; INMSSP.
 DR HSSP; P01308; 1EV6.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR PRINTS; PR00277; INSULINB.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family.
 FT CHAIN 1 30 Insulin B chain.
 FT NON_CONS 30 31
 FT CHAIN 31 51 Insulin A chain.
 FT DISULFID 7 37 Interchain (By similarity).
 FT DISULFID 19 50 Interchain (By similarity).
 FT DISULFID 36 41 By similarity.
 SQ SEQUENCE 51 AA; 5768 MW; 992BD8B629047D3D CRC64;

Query Match 91.3%; Score 268.5; DB 1; Length 51;
 Best Local Similarity 92.3%; Pred. No. 2.1e-25;
 Matches 48; Conservative 3; Mismatches 0; Indels 1; Gaps 1;

QY 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSI~~CS~~LYQLENYCN 52
 ||:|||||||||||||||||||||||: |||:|||||||||||||||
 Db 1 FVBQHLCGSHLVEALYLVCGERGFFYTPKS-GIVDQCCTSI~~CS~~LYQLENYCN 51

RESULT 7
 Q7M217

ID Q7M217 PRELIMINARY; PRT; 51 AA.
 AC Q7M217;
 DT 01-MAR-2004 (TrEMBLrel. 26, Created)
 DT 01-MAR-2004 (TrEMBLrel. 26, Last sequence update)
 DT 01-MAR-2004 (TrEMBLrel. 26, Last annotation update)

RL Mol. Biol. Evol. 9:193-203(1992).
 RN [2]
 RP SEQUENCE OF 57-87.
 RX MEDLINE=72258016; PubMed=4626369;
 RA Peterson J.D., Nehrlich S., Oyer P.E., Steiner D.F.;
 RT "Determination of the amino acid sequence of the monkey, sheep, and
 RT dog proinsulin C-peptides by a semi-micro Edman degradation
 RT procedure.";
 RL J. Biol. Chem. 247:4866-4871(1972).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 CC -----
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 CC -----
 DR EMBL; X61092; CAA43405.1; -.
 DR PIR; B42179; B42179.
 DR HSSP; P01308; 1AI0.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR Pfam; PF00049; Insulin; 1.
 DR PRINTS; PR00277; INSULINB.
 DR ProDom; PD015667; Mollusc_ins; 1.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family; Signal.
 FT SIGNAL 1 24
 FT CHAIN 25 54 Insulin B chain.
 FT PROPEP 57 87 C peptide.
 FT CHAIN 90 110 Insulin A chain.
 FT DISULFID 31 96 Interchain.
 FT DISULFID 43 109 Interchain.
 FT DISULFID 95 100
 SQ SEQUENCE 110 AA; 12019 MW; 95A1F54BE7B247F9 CRC64;

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 6.7e-25;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
 ||||||||||||||||||
 Db 25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDPQVGQVELGGGPGAGSLQPLALEG 84

 Qy 31 ----RGIVEQCCTSIQSLYQLENYCN 52
 ||||||||||||||||||
 Db 85 SLQKRGIVEQCCTSIQSLYQLENYCN 110

RESULT 9

INS_GORGO

ID INS_GORGO STANDARD; PRT; 110 AA.

AC Q6YK33;

DT 25-OCT-2004 (Rel. 45, Created)

DT 25-OCT-2004 (Rel. 45, Last sequence update)

DT 25-OCT-2004 (Rel. 45, Last annotation update)

DE Insulin precursor.

GN Name=INS;

OS Gorilla gorilla gorilla (Lowland gorilla).

OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;

OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

OX NCBI_TaxID=9595;

RN [1]

RP SEQUENCE FROM N.A.

RX MEDLINE=22833521; PubMed=12952878; DOI=10.1101/gr.948003;

RA Stead J.D.H., Hurles M.E., Jeffreys A.J.;

RT "Global haplotype diversity in the human insulin gene region.";

RL Genome Res. 13:2101-2111(2003).

CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.

CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.

CC -!- SUBCELLULAR LOCATION: Secreted.

CC -!- SIMILARITY: Belongs to the insulin family.

CC -----
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 CC or send an email to license@isb-sib.ch).
 CC -----

DR EMBL; AY137500; AAN06935.1; -.

DR InterPro; IPR004825; Ins/IGF/relax.

DR InterPro; IPR003234; Mollusc_ins.

DR Pfam; PF00049; Insulin; 1.

DR PRINTS; PR00277; INSULINB.

DR ProDom; PD015667; Mollusc_ins; 1.

DR SMART; SM00078; IIGF; 1.

DR PROSITE; PS00262; INSULIN; 1.

KW Glucose metabolism; Hormone; Insulin family; Signal.

FT SIGNAL 1 24 By similarity.

FT CHAIN 25 54 Insulin B chain.

FT PROPEP 57 87 C peptide.

FT CHAIN 90 110 Insulin A chain.

FT DISULFID 31 96 Interchain (By similarity).

FT DISULFID 43 109 Interchain (By similarity).

FT DISULFID 95 100 By similarity.

SQ SEQUENCE 110 AA; 11981 MW; C2C3B23B85E520E5 CRC64;

Query Match

90.8%; Score 267; DB 1; Length 110;

Best Local Similarity 60.5%; Pred. No. 6.7e-25;
Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

```
Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
          |||
Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGGPGAGSLQPIALEG 84

Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110
```

RESULT 10

INS_HUMAN

```
ID  INS_HUMAN      STANDARD;      PRT;    110 AA.
AC  P01308;
DT  21-JUL-1986 (Rel. 01, Created)
DT  21-JUL-1986 (Rel. 01, Last sequence update)
DT  25-OCT-2004 (Rel. 45, Last annotation update)
DE  Insulin precursor.
GN  Name=INS;
OS  Homo sapiens (Human).
OC  Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC  Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.
OX  NCBI_TaxID=9606;
RN  [1]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=80120725; PubMed=6243748;
RA  Bell G.I., Pictet R.L., Rutter W.J., Cordell B., Tischer E.,
RA  Goodman H.M.;
RT  "Sequence of the human insulin gene.";
RL  Nature 284:26-32(1980).
RN  [2]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=80236313; PubMed=6248962;
RA  Ullrich A., Dull T.J., Gray A., Brosius J., Sures I.;
RT  "Genetic variation in the human insulin gene.";
RL  Science 209:612-615(1980).
RN  [3]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=80054779; PubMed=503234;
RA  Bell G.I., Swain W.F., Pictet R.L., Cordell B., Goodman H.M.,
RA  Rutter W.J.;
RT  "Nucleotide sequence of a cDNA clone encoding human preproinsulin.";
RL  Nature 282:525-527(1979).
RN  [4]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=80147417; PubMed=6927840;
RA  Sures I., Goeddel D.V., Gray A., Ullrich A.;
RT  "Nucleotide sequence of human preproinsulin complementary DNA.";
RL  Science 208:57-59(1980).
RN  [5]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=93364428; PubMed=8358440;
RA  Lucassen A.M., Bell J.I., Julier C., Lathrop M.;
RT  "Susceptibility to insulin dependent diabetes mellitus maps to a 4.1
RT  kb segment of DNA spanning the insulin gene and associated VNTR.";
```

RL Nat. Genet. 4:305-310(1993).
 RN [6]
 RP SEQUENCE FROM N.A.
 RC TISSUE=Pancreas;
 RX MEDLINE=22388257; PubMed=12477932; DOI=10.1073/pnas.242603899;
 RA Strausberg R.L., Feingold E.A., Grouse L.H., Derge J.G.,
 RA Klausner R.D., Collins F.S., Wagner L., Shenmen C.M., Schuler G.D.,
 RA Altschul S.F., Zeeberg B., Buetow K.H., Schaefer C.F., Bhat N.K.,
 RA Hopkins R.F., Jordan H., Moore T., Max S.I., Wang J., Hsieh F.,
 RA Diatchenko L., Marusina K., Farmer A.A., Rubin G.M., Hong L.,
 RA Stapleton M., Soares M.B., Bonaldo M.F., Casavant T.L., Scheetz T.E.,
 RA Brownstein M.J., Usdin T.B., Toshiyuki S., Carninci P., Prange C.,
 RA Raha S.S., Loquellano N.A., Peters G.J., Abramson R.D., Mullahy S.J.,
 RA Bosak S.A., McEwan P.J., McKernan K.J., Malek J.A., Gunaratne P.H.,
 RA Richards S., Worley K.C., Hale S., Garcia A.M., Gay L.J., Hulyk S.W.,
 RA Villalon D.K., Muzny D.M., Sodergren E.J., Lu X., Gibbs R.A.,
 RA Fahey J., Helton E., Kettelman M., Madan A., Rodrigues S., Sanchez A.,
 RA Whiting M., Madan A., Young A.C., Shevchenko Y., Bouffard G.G.,
 RA Blakesley R.W., Touchman J.W., Green E.D., Dickson M.C.,
 RA Rodriguez A.C., Grimwood J., Schmutz J., Myers R.M.,
 RA Butterfield Y.S.N., Krzywinski M.I., Skalska U., Smailus D.E.,
 RA Schnerch A., Schein J.E., Jones S.J.M., Marra M.A.;
 RT "Generation and initial analysis of more than 15,000 full-length human
 RT and mouse cDNA sequences.";
 RL Proc. Natl. Acad. Sci. U.S.A. 99:16899-16903(2002).
 RN [7]
 RP SEQUENCE OF 1-59 FROM N.A.
 RC TISSUE=Blood;
 RA Fajardy I.I., Weill J.J., Stuckens C.C., Danze P.M.P.;
 RT "Description of a novel RFLP diallelic polymorphism (-127 BsgI C/G)
 RT within the 5' region of insulin gene.";
 RL Submitted (JUL-1998) to the EMBL/GenBank/DDBJ databases.
 RN [8]
 RP SEQUENCE OF 25-54 AND 90-110.
 RX PubMed=14426955;
 RA Nicol D.S.H.W., Smith L.F.;
 RT "Amino-acid sequence of human insulin.";
 RL Nature 187:483-485(1960).
 RN [9]
 RP SEQUENCE OF 57-87.
 RX MEDLINE=71116410; PubMed=5101771;
 RA Oyer P.E., Cho S., Peterson J.D., Steiner D.F.;
 RT "Studies on human proinsulin. Isolation and amino acid sequence of the
 RT human pancreatic C-peptide.";
 RL J. Biol. Chem. 246:1375-1386(1971).
 RN [10]
 RP SEQUENCE OF 57-87.
 RX MEDLINE=71257722; PubMed=5560404;
 RA Ko A., Smyth D.G., Markussen J., Sundby F.;
 RT "The amino acid sequence of the C-peptide of human proinsulin.";
 RL Eur. J. Biochem. 20:190-199(1971).
 RN [11]
 RP SYNTHESIS.
 RX MEDLINE=75077277; PubMed=4443293;
 RA Sieber P., Kamber B., Hartmann A., Joehl A., Riniker B., Rittel W.;
 RT "Total synthesis of human insulin under directed formation of the
 RT disulfide bonds.";

RL Helv. Chim. Acta 57:2617-2621(1974).
 RN [12]
 RP SYNTHESIS OF 57-87.
 RX MEDLINE=75040007; PubMed=4803504;
 RA Naithani V.K.;
 RT "Studies on polypeptides, IV. The synthesis of C-peptide of human
 RT proinsulin.";
 RL Hoppe-Seyler's Z. Physiol. Chem. 354:659-672(1973).
 RN [13]
 RP SYNTHESIS OF 65-69 AND 70-73.
 RX MEDLINE=73161263; PubMed=4698555;
 RA Geiger R., Volk A.;
 RT "Synthesis of peptides with the properties of human proinsulin C
 RT peptides (hC peptide). 3. Synthesis of the sequences 14-17 and 9-13 of
 RT human proinsulin C peptides.";
 RL Chem. Ber. 106:199-205(1973).
 RN [14]
 RP SYNTHESIS OF 84-87.
 RX MEDLINE=73161261; PubMed=4698553;
 RA Geiger R., Jaeger G., Keonig W., Treuth G.;
 RT "Synthesis of peptides with the properties of human proinsulin C
 RT peptides (hC peptide). I. Scheme for the synthesis and preparation of
 RT the sequence 28-31 of human proinsulin C peptide.";
 RL Chem. Ber. 106:188-192(1973).
 RN [15]
 RP VARIANT LOS ANGELES SER-48.
 RX MEDLINE=84016053; PubMed=6312455;
 RA Haneda M., Chan S.J., Kwok S.C.M., Rubenstein A.H., Steiner D.F.;
 RT "Studies on mutant human insulin genes: identification and sequence
 RT analysis of a gene encoding [SerB24]insulin.";
 RL Proc. Natl. Acad. Sci. U.S.A. 80:6366-6370(1983).
 RN [16]
 RP VARIANTS LOS ANGELES SER-48 AND CHICAGO LEU-49.
 RX MEDLINE=84170233; PubMed=6424111;
 RA Shoelson S., Fickova M., Haneda M., Nahum A., Musso G., Kaiser E.T.,
 RA Rubenstein A.H., Tager H.;
 RT "Identification of a mutant human insulin predicted to contain a
 RT serine-for-phenylalanine substitution.";
 RL Proc. Natl. Acad. Sci. U.S.A. 80:7390-7394(1983).
 RN [17]
 RP VARIANT PROVIDENCE ASP-34.
 RX MEDLINE=87175640; PubMed=3470784;
 RA Chan S.J., Seino S., Gruppuso P.A., Schwartz R., Steiner D.F.;
 RT "A mutation in the B chain coding region is associated with impaired
 RT proinsulin conversion in a family with hyperproinsulinemia.";
 RL Proc. Natl. Acad. Sci. U.S.A. 84:2194-2197(1987).
 RN [18]
 RP VARIANT WAKAYAMA LEU-92.
 RX MEDLINE=87058122; PubMed=3537011;
 RA Sakura H., Iwamoto Y., Sakamoto Y., Kuzuya T., Hirata H.;
 RT "Structurally abnormal insulin in a diabetic patient. Characterization
 RT of the mutant insulin A3 (Val-->Leu) isolated from the pancreas.";
 RL J. Clin. Invest. 78:1666-1672(1986).
 RN [19]
 RP VARIANT HIS-89.
 RX MEDLINE=90317021; PubMed=2196279;
 RA Barbetti F., Raben N., Kadowaki T., Cama A., Accili D., Gabbay K.H.,

RA Merenich J.A., Taylor S.I., Roth J.;
 RT "Two unrelated patients with familial hyperproinsulinemia due to a
 RT mutation substituting histidine for arginine at position 65 in the
 RT proinsulin molecule: identification of the mutation by direct
 RT sequencing of genomic deoxyribonucleic acid amplified by polymerase
 RT chain reaction.";
 RL J. Clin. Endocrinol. Metab. 71:164-169(1990).
 RN [20]
 RP VARIANT HIS-89.
 RX MEDLINE=85261996; PubMed=4019786;
 RA Shibasaki Y., Kawakami T., Kanazawa Y., Akanuma Y., Takaku F.;
 RT "Posttranslational cleavage of proinsulin is blocked by a point
 RT mutation in familial hyperproinsulinemia.";
 RL J. Clin. Invest. 76:378-380(1985).
 RN [21]
 RP VARIANT KYOTO LEU-89.
 RX MEDLINE=92291307; PubMed=1601997;
 RA Yano H., Kitano N., Morimoto M., Polonsky K.S., Imura H., Seino Y.;
 RT "A novel point mutation in the human insulin gene giving rise to
 RT hyperproinsulinemia (proinsulin Kyoto).";
 RL J. Clin. Invest. 89:1902-1907(1992).
 RN [22]
 RP STRUCTURE BY NMR.
 RX MEDLINE=91104966; PubMed=2271664;
 RA Hua Q.-X., Weiss M.A.;
 RT "Toward the solution structure of human insulin: sequential 2D 1H NMR
 RT assignment of a des-pentapeptide analogue and comparison with crystal
 RT structure.";
 RL Biochemistry 29:10545-10555(1990).
 RN [23]
 RP STRUCTURE BY NMR.
 RX MEDLINE=91242467; PubMed=2036420;
 RA Hua Q.-X., Weiss M.A.;
 RT "Comparative 2D NMR studies of human insulin and des-pentapeptide
 RT insulin: sequential resonance assignment and implications for protein
 RT dynamics and receptor recognition.";
 RL Biochemistry 30:5505-5515(1991).
 RN [24]
 RP STRUCTURE BY NMR.
 RX MEDLINE=91265527; PubMed=1646635; DOI=10.1016/0167-4838(91)90098-K;
 RA Hua Q.-X., Weiss M.A.;
 RT "Two-dimensional NMR studies of Des-(B26-B30)-insulin: sequence-
 RT specific resonance assignments and effects of solvent composition.";

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 6.7e-25;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
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Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGGPGAGSLQPLALEG 84

Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          ||||||||||||||||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110
  
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RESULT 11

INS_MACFA

ID INS_MACFA STANDARD; PRT; 110 AA.
AC P30406; P01309;
DT 21-JUL-1986 (Rel. 01, Created)
DT 13-AUG-1987 (Rel. 05, Last sequence update)
DT 05-JUL-2004 (Rel. 44, Last annotation update)
DE Insulin precursor.
GN Name=INS;
OS *Macaca fascicularis* (Crab eating macaque) (*Cynomolgus* monkey).
OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC Mammalia; Eutheria; Primates; Catarrhini; Cercopithecidae;
OC Cercopithecinae; *Macaca*.
OX NCBI_TaxID=9541;
RN [1]
RP SEQUENCE FROM N.A.
RX MEDLINE=83080474; PubMed=6184262; DOI=10.1016/0378-1119(82)90004-X;
RA Wetekam W., Groneberg J., Leineweber M., Wengenmayer F.,
RA Winnacker E.-L.;
RT "The nucleotide sequence of cDNA coding for preproinsulin from the
RT primate *Macaca fascicularis*."
RL Gene 19:179-183(1982).
CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
CC increases cell permeability to monosaccharides, amino acids and
CC fatty acids. It accelerates glycolysis, the pentose phosphate
CC cycle, and glycogen synthesis in liver.
CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
CC disulfide bonds.
CC -!- SUBCELLULAR LOCATION: Secreted.
CC -!- SIMILARITY: Belongs to the insulin family.
CC -----
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CC or send an email to license@isb-sib.ch).
CC -----
DR EMBL; J00336; AAA36849.1; -.
DR PIR; JQ0178; JQ0178.
DR HSSP; P01308; 1AI0.
DR InterPro; IPR004825; Ins/IGF/relax.
DR Pfam; PF00049; Insulin; 1.
DR PRINTS; PR00277; INSULINB.
DR ProDom; PD015667; Mollusc_ins; 1.
DR SMART; SM00078; IIGF; 1.
DR PROSITE; PS00262; INSULIN; 1.
KW Glucose metabolism; Hormone; Insulin family; Signal.
FT SIGNAL 1 24
FT CHAIN 25 54 Insulin B chain.
FT PROPEP 57 87 C peptide.
FT CHAIN 90 110 Insulin A chain.
FT DISULFID 31 96 Interchain.
FT DISULFID 43 109 Interchain.
FT DISULFID 95 100
SQ SEQUENCE 110 AA; 11991 MW; 83C6E33A80A420F9 CRC64;

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 6.7e-25;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

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Qy      1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
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Db      25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDPQVGQVELGGGPGAGSLQPLALEG 84
          |||

Qy      31 ----RGIVEQCCTSICSLYQLENYCN 52
          |||
Db      85 SLQKRGIVEQCCTSICSLYQLENYCN 110
  
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RESULT 12

INS_PANTR

```

ID  INS_PANTR      STANDARD;      PRT;      110 AA.
AC  P30410;
DT  01-APR-1993 (Rel. 25, Created)
DT  01-APR-1993 (Rel. 25, Last sequence update)
DT  25-OCT-2004 (Rel. 45, Last annotation update)
DE  Insulin precursor.
GN  Name=INS;
OS  Pan troglodytes (Chimpanzee).
OC  Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
OC  Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pan.
OX  NCBI_TaxID=9598;
RN  [1]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=92219953; PubMed=1560757;
RA  Seino S., Bell G.I., Li W.;
RT  "Sequences of primate insulin genes support the hypothesis of a slower
RT  rate of molecular evolution in humans and apes than in monkeys.";
RL  Mol. Biol. Evol. 9:193-203(1992).
RN  [2]
RP  SEQUENCE FROM N.A.
RX  MEDLINE=22833521; PubMed=12952878; DOI=10.1101/gr.948003;
RA  Stead J.D.H., Hurles M.E., Jeffreys A.J.;
RT  "Global haplotype diversity in the human insulin gene region.";
RL  Genome Res. 13:2101-2111(2003).
CC  -!- FUNCTION: Insulin decreases blood glucose concentration. It
CC  increases cell permeability to monosaccharides, amino acids and
CC  fatty acids. It accelerates glycolysis, the pentose phosphate
CC  cycle, and glycogen synthesis in liver.
CC  -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
CC  disulfide bonds.
CC  -!- SUBCELLULAR LOCATION: Secreted.
CC  -!- SIMILARITY: Belongs to the insulin family.
CC  -----
CC  This SWISS-PROT entry is copyright. It is produced through a collaboration
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DR EMBL; X61089; CAA43403.1; -.
 DR EMBL; AY137497; AAN06933.1; -.
 DR PIR; A42179; A42179.
 DR HSSP; P01308; 1AI0.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR Pfam; PF00049; Insulin; 1.
 DR PRINTS; PR00277; INSULINB.
 DR ProDom; PD015667; Mollusc_ins; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Glucose metabolism; Hormone; Insulin family; Signal.
 FT SIGNAL 1 24 By similarity.
 FT CHAIN 25 54 Insulin B chain.
 FT PROPEP 57 87 C peptide.
 FT CHAIN 90 110 Insulin A chain.
 FT DISULFID 31 96 Interchain (By similarity).
 FT DISULFID 43 109 Interchain (By similarity).
 FT DISULFID 95 100 By similarity.
 SQ SEQUENCE 110 AA; 12025 MW; 41EB8DF79837CEF5 CRC64;

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 6.7e-25;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
 |||||
 Db 25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGGPGAGSLQPLALEG 84
 Qy 31 ----RGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 85 SLQKRGIVEQCCTSICSLYQLENYCN 110

RESULT 13

INS_PONPY

ID INS_PONPY STANDARD; PRT; 110 AA.
 AC Q8HXV2;
 DT 05-JUL-2004 (Rel. 44, Created)
 DT 05-JUL-2004 (Rel. 44, Last sequence update)
 DT 05-JUL-2004 (Rel. 44, Last annotation update)
 DE Insulin precursor.
 GN Name=INS;
 OS Pongo pygmaeus (Orangutan).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Pongo.
 OX NCBI_TaxID=9600;
 RN [1]
 RP SEQUENCE FROM N.A.
 RX MEDLINE=22833521; PubMed=12952878; DOI=10.1101/gr.948003;
 RA Stead J.D.H., Hurles M.E., Jeffreys A.J.;
 RT "Global haplotype diversity in the human insulin gene region."
 RL Genome Res. 13:2101-2111(2003).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.

CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 CC -----
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 CC or send an email to license@isb-sib.ch).
 CC -----
 DR EMBL; AY137503; AAN06937.1; -.
 DR HSSP; P01308; 1AI0.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR Pfam; PF00049; Insulin; 1.
 DR PRINTS; PR00277; INSULINB.
 DR ProDom; PD015667; Mollusc_ins; 1.
 DR SMART; SM00078; ILGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Glucose metabolism; Hormone; Insulin family; Signal.
 FT SIGNAL 1 24 By similarity.
 FT CHAIN 25 54 Insulin B chain.
 FT PROPEP 57 87 C peptide.
 FT CHAIN 90 110 Insulin A chain.
 FT DISULFID 31 96 Interchain (By similarity).
 FT DISULFID 43 109 Interchain (By similarity).
 FT DISULFID 95 100 By similarity.
 SQ SEQUENCE 110 AA; 12038 MW; 22D2B32B94F520F8 CRC64;

Query Match 90.8%; Score 267; DB 1; Length 110;
 Best Local Similarity 60.5%; Pred. No. 6.7e-25;
 Matches 52; Conservative 0; Mismatches 0; Indels 34; Gaps 1;

Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKT----- 30
 |||||
 Db 25 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRREAEDLQVGQVELGGPGAGSLQPLALEG 84
 Qy 31 ----RGIVEQCCTSICSLYQLENYCN 52
 |||||
 Db 85 SLQKRGIVEQCCTSICSLYQLENYCN 110

RESULT 14

INS_BALBO

ID INS_BALBO STANDARD; PRT; 51 AA.
 AC P01314;
 DT 21-JUL-1986 (Rel. 01, Created)
 DT 21-JUL-1986 (Rel. 01, Last sequence update)
 DT 25-OCT-2004 (Rel. 45, Last annotation update)
 DE Insulin.
 GN Name=INS;
 OS Balaenoptera borealis (Sei whale).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Cetartiodactyla; Cetacea; Mysticeti;
 OC Balaenopteridae; Balaenoptera.
 OX NCBI_TaxID=9768;
 RN [1]

RP SEQUENCE.
 RX PubMed=13552701;
 RA Ishihara Y., Saito T., Ito Y., Fujino M.;
 RT "Structure of sperm- and sei-whale insulins and their breakdown by
 RT whale pepsin.";
 RL Nature 181:1468-1469(1958).
 CC -!- FUNCTION: Insulin decreases blood glucose concentration. It
 CC increases cell permeability to monosaccharides, amino acids and
 CC fatty acids. It accelerates glycolysis, the pentose phosphate
 CC cycle, and glycogen synthesis in liver.
 CC -!- SUBUNIT: Heterodimer of a B chain and an A chain linked by two
 CC disulfide bonds.
 CC -!- SUBCELLULAR LOCATION: Secreted.
 CC -!- SIMILARITY: Belongs to the insulin family.
 DR PIR; A01582; INWH1S.
 DR HSSP; P01317; 1APH.
 DR InterPro; IPR004825; Ins/IGF/relax.
 DR PRINTS; PR00277; INSULINB.
 DR SMART; SM00078; IIGF; 1.
 DR PROSITE; PS00262; INSULIN; 1.
 KW Direct protein sequencing; Glucose metabolism; Hormone;
 KW Insulin family.
 FT CHAIN 1 30 Insulin B chain.
 FT NON_CONS 30 31
 FT CHAIN 31 51 Insulin A chain.
 FT DISULFID 7 37 Interchain.
 FT DISULFID 19 50 Interchain.
 FT DISULFID 36 41
 SQ SEQUENCE 51 AA; 5723 MW; 9007B50E400A7DDD CRC64;

 Query Match 89.6%; Score 263.5; DB 1; Length 51;
 Best Local Similarity 92.3%; Pred. No. 8.6e-25;
 Matches 48; Conservative 0; Mismatches 3; Indels 1; Gaps 1;

 Qy 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKTRGIVEQCCTSICSLYQLENYCN 52
 ||||| |
 Db 1 FVNQHLCGSHLVEALYLVCGERGFFYTPKA-GIVEQCCASTCSLYQLENYCN 51

RESULT 15
 INS_CAMDR
 ID INS_CAMDR STANDARD; PRT; 51 AA.
 AC P01320;
 DT 21-JUL-1986 (Rel. 01, Created)
 DT 21-JUL-1986 (Rel. 01, Last sequence update)
 DT 05-JUL-2004 (Rel. 44, Last annotation update)
 DE Insulin.
 GN Name=INS;
 OS Camelus dromedarius (Dromedary) (Arabian camel).
 OC Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
 OC Mammalia; Eutheria; Cetartiodactyla; Tylopoda; Camelidae; Camelus.
 OX NCBI_TaxID=9838;
 RN [1]
 RP SEQUENCE.
 RA Danho W.O.;
 RT "The isolation and characterization of insulin of camel (Camelus
 RT dromedarius).";

